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POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268-0001

POSTAL RATE AND FEE CHANGES, 2000

Docket No. R2000-1

DIRECT TESTIMONY
OF
PETER BERNSTEIN
ON BEHALF OF
UNITED STATES POSTAL SERVICE

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DIRECT TESTIMONY
OF
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AUTOBIOGRAPHICAL SKETCH

My name is Peter Bernstein. I am vice-president of RCF Economic and Financial Consulting, Inc., where I have been employed since 1992. As vice-president, I have major responsibilities in RCF's forecasting, econometrics, and quantitative analysis activities. I submitted testimony on Ramsey pricing in R97-1 and in the MC97-2 parcel classification reform case. I have also assisted Dr. George Tolley, President of RCF, in the development of his testimony for Docket Nos. R94-1, MC95-1, and MC96-2, R97-1, and R2000-1.

In addition to my responsibilities at RCF, I have been a faculty member of the department of economics at DePaul University of Chicago since 1992, where I have taught courses in economics, finance, and econometrics. I was a faculty member of the department of economics at Loyola University of Chicago from 1987 to 1991, and also taught classes at the University of Chicago Graduate School of Business in 1987.

In 1985, I earned a Master's Degree in Finance and Economics from the University of Chicago Graduate School of Business and I have completed all course work and examinations toward a Ph.D. from the University of Chicago. I received a B.A. in Economics from the University of Chicago in 1981.

PURPOSE AND SCOPE OF TESTIMONY

This testimony analyzes how mailers are affected by different postal rate schedules. Two rate schedules are given particular focus. One rate schedule is obtained from the application of the Ramsey pricing principles in which postal rates are based on product marginal costs and elasticities of demand. The second rate schedule is based on the Postal Rate Commission's (PRC) R97-1 recommended mark-ups of price over attributable cost. Both of these rate schedules generate the same level of net revenues in GFY 2001, where net revenues are equal to the excess of total revenues over total volume variable costs.

In comparing any two rate schedules, the overall impact on users of the mail is measured by the change in total consumer surplus. This testimony provides a definition of consumer surplus and shows how consumer surplus is affected by changes in prices. The link between changes in consumer surplus and changes in net revenues is explained, with special attention given to the importance of the price elasticity of demand.

A pricing formula, known as Ramsey pricing, is shown to minimize the loss of consumer surplus resulting from the need to generate sufficient net revenue to satisfy the break-even requirement. The Ramsey pricing equation is presented and explained.

Postal prices that satisfy the break-even requirement for GFY 2001 are calculated based on the Ramsey pricing principles. The rates are referred to in this testimony as "Ramsey prices," but they actually reflect adjustments to the Ramsey pricing formula to take account of various constraints, some imposed by economic theory, others imposed by postal rate-making regulations and practices. The basis for the constraints is explained.

The Ramsey-based rates are compared to rates based on the PRC's recommended mark-ups from the R97-1 case. These rates, which satisfy the break-even requirement for GFY 2001 are referred to as "R97-1 Index" rates because they are designed to maintain

the same relative mark-up of price over attributable cost per piece as recommended in R97-1. They are not an estimate or suggestion of what rates should be recommended in the current case, but are put forth for purposes of comparison to the Ramsey-based rates.

Comparisons between the two rate schedules are presented. Impacts on prices, volumes, and net revenues (also known as contribution) are examined and explained. The effect of the different rate schedules on users of the mail, as measured by the change in consumer surplus, is also calculated. Other rate schedules are also analyzed in terms of impacts on consumer surplus.

Another aspect of this testimony is to provide a guideline for postal pricing based on the principle of economic efficiency. To the extent that factors beyond economic efficiency are included in the postal rate-making process, the cost – in terms of reduced consumer surplus – of those other factors can be measured.

EXECUTIVE SUMMARY

1. After-rates postal prices must satisfy the break-even requirement.

After-rates postal prices must generate total revenues equal to total costs projected for the Test Year, which in this case is GFY 2001. Total costs can be decomposed into volume variable and non-volume variable costs. It is customary to think of postal rates generating net revenues, defined as the excess of total revenues over total volume variable costs. Therefore, break-even occurs if net revenues are equal to non-volume variable costs.

2. There are many different sets of rates that satisfy the break-even requirement.

Total net revenues are equal to the sum of the net revenues generated by each individual postal product. Product net revenues are the excess of product revenues over product volume variable costs. There are many different combinations of individual product net revenues that yield the same total net revenues. As a general rule, product net revenues decrease when product price is lowered and increase when product price is raised. Therefore, to keep total net revenues unchanged, a decrease in the price of one postal product will require an increase in the price of one (or more) other postal products. Therefore, it is possible to generate the same level of net revenues from many different sets of postal rates by raising some prices and lowering others.

3. The impact on mailers of a move from one set of rates to another is measured by the change in consumer surplus.

The impact on mailers of increases and decreases in postal rates is measured by the change in consumer surplus. Consumer surplus is a measure of the gain to consumers from the purchase of a good and is equal to the difference between the

consumers' value of a good and the price that consumers must pay for the good. Increases in postal rates reduce consumer surplus and decreases in postal rates increase consumer surplus. In comparing any two break-even postal rate schedules, some rates will be higher (reducing consumer surplus) and some rates will be lower (increasing consumer surplus). The overall impact on mailers from the move from one rate schedule to another is measured by the total change in consumer surplus across all the mail products.

4. Price changes affect consumer surplus in two ways.

When the price of a mail product is reduced, consumers gain in two ways. First, they gain because they pay less for each unit that they previously purchased at the higher price. Second, consumers gain because the price decline causes them to increase their consumption. The increase in consumption increases consumer surplus because it involves purchasing units with a value that exceeds the now lower price. Similarly, when price is increased, consumers lose in two ways, from the increase in money they must spend to purchase goods at the higher price, and from the decrease in consumption that occurs in response to the increase in price.

5. Elasticity of demand shows how quantity demanded changes when price changes.

An increase in price will cause consumers to purchase less of a product. The degree to which quantity demand falls in response to the increase in price is measured by the price elasticity of demand. If demand is very price elastic, it means that an increase in price causes a large decline in quantity demanded. If demand is not very price elastic, then an increase in price causes only a small decline in the quantity demanded.

6. Elasticity of demand plays the key role in determining how price changes affect net revenues.

When the price of a postal product is increased, net revenues earned by the Postal Service increase. The magnitude of the net revenue increase depends on the elasticity of demand of the product. If the product demand is relatively elastic, then the price increase causes a relatively large fall in consumption. Since net revenues are only earned on units that are actually consumed, a large fall in consumption results in a smaller increase in net revenues. In contrast, if demand is relatively price inelastic, an increase in price causes a small decline in consumption and the resulting increase in net revenues is greater.

7. Greater price increases are needed to raise net revenues from more price elastic products.

Increasing the price of a product that is relatively price elastic is a less effective way of raising a required amount of net revenue. The price increase causes a large decline in consumption, and the net revenue increase is consequently smaller. Therefore, a greater price increase is needed to raise a given amount of net revenue from a price elastic product as opposed to raising the same net revenue from a less price elastic product.

8. Price increases impose harm on mailers that exceeds the increase in net revenues.

An increase in product price raises net revenues for the Postal Service, but it imposes an even larger burden on mailers. Mailers are harmed by the increase in expenditures for the mail they send at the higher price, and by the decrease in their usage of the mail in response to the price increase. Furthermore, the Postal Service loses whatever net revenues had been earned on the volume that is lost due to the price

increase. Therefore, the harm imposed on mailers, which includes the harm associated with the decline in consumption, exceeds the increase in net revenues.

9. A pricing method that minimizes the harm to consumers while still satisfying the break-even requirement is known as Ramsey pricing.

The increase in mailer expenditures that goes toward net revenues is an unavoidable burden on mailers, made necessary by the break-even requirement. All break-even postal rate schedules impose this burden. However, the burden on mailers due to the decline in volume that comes from higher prices differs across different postal rate schedules. The Ramsey pricing formula is used to find prices that minimize the total burden on consumers while still satisfying the break-even requirement.

10. In general, Ramsey pricing establishes lower mark-ups on relatively price elastic products and higher mark-ups on relatively price inelastic products.

A simplified version of the Ramsey pricing formula is the Inverse Elasticity Rule (IER). According to the IER, the mark-up on relatively price elastic products is less than the mark-up on relatively price inelastic products. This follows from the fact that large mark-ups for elastic products should be avoided because they lead to large declines in volume, harming consumers while producing smaller increases in net revenue.

11. Prices presented in this testimony are not pure Ramsey rates, but still provide important benefits to mailers.

The Ramsey pricing formula provides a guideline for postal rate-making, based on the goal of minimizing the burden on mailers. The prices presented in this testimony are not pure Ramsey prices because a number of constraints are imposed to take account of various conditions, regulations, and practices specific to postal rate-making. Nonetheless,

the "Ramsey-based" prices presented herein provide important benefits to mailers while satisfying the break-even requirement for the GFY 2001 Test Year.

12. Ramsey-based rates are compared to rates based on the R97-1 Mark-up Index.

The benefits to mailers from the Ramsey-based rates can be seen through a comparison to another break-even rate schedule. The alternate rate scheduled considered in this testimony is based on the Postal Rate Commission's (PRC) R97-1 Mark-up Index. Break-even rates for GFY 2001 are calculated in a way that keeps the same relative mark-ups as was recommended by the PRC in R97-1. The Ramsey-based rates are compared to the R97-1 Index rates and the difference in consumer surplus is calculated.

13. Summary Table 1 shows a comparison of Ramsey and R97-1 Index Rates.

Summary Table 2 shows a comparison of Ramsey and R97-1 Index mark-ups over marginal (volume variable) cost.

Summary Table 1 presents a comparison of the before-rates prices, the after-rates R97-1 Index prices and the after-rates Ramsey prices. Both after-rates price schedules yield the same net revenue, where net revenue is measured as revenue in excess of volume variable costs. Summary Table 1 shows that the Ramsey price of First-Class letters, measured as a fixed weight index price, is $0.3704, or about 7.6 percent more than the R97-1 Index price of letters, and about 7.8 percent more than the before-rates price. Ramsey prices of First-Class cards, Priority Mail, Express Mail, and Standard A Mail are all less than the R97-1 Index prices. Ramsey prices of Periodicals Mail, Standard B mail and most of the special services are greater than the R97-1 Index prices.

Summary Table 2 shows estimated own-price elasticities of demand and a comparison of mark-ups under Ramsey and R97-1 Index pricing. Mark-ups are measured as the excess of revenues over volume variable cost, or the excess of price over marginal cost. Table 2 shows that mail products that are more price sensitive (have higher own-price elasticities) have lower mark-ups under Ramsey pricing than under R97-1 Index pricing. This is consistent with a basic principle of Ramsey pricing, namely, that high mark-ups on price sensitive products lead to large volume declines and are therefore a less effective way of increasing net revenues. Summary Table 2 also shows that the overall mark-up (total revenues divided by total volume variable costs) under R97-1 Index pricing is 67.6 percent. The overall mark-up under Ramsey pricing is only 63.7 percent, evidence that the Ramsey prices raise the required net revenue in a more efficient way.

SUMMARY TABLE 1
Price Comparison

Mail Product	Before-Rates Price	After-Rates Price (R97-1 Index)	After-Rates Price (Ramsey Pricing)
First-Class Letters	$0.3437	$0.3442	$0.3704
First-Class Cards	$0.1841	$0.2111	$0.1794
Priority Mail	$3.8550	$4.4382	$3.0037
Express Mail	$14.0402	$11.2503	$10.0346
Periodicals In-County	$0.0854	$0.0979	$0.1414
Periodicals Nonprofit	$0.1614	$0.1881	$0.2650
Periodicals Classroom	$0.2293	$0.2692	$0.3798
Periodicals Regular	$0.2409	$0.2927	$0.5482
Standard Regular	$0.2018	$0.2407	$0.2251
Standard ECR	$0.1494	$0.1594	$0.0864
Standard Nonprofit	$0.1231	$0.1450	$0.1355
Standard NP ECR	$0.0763	$0.1163	$0.0785
Parcel Post	$3.1054	$3.1547	$3.2448
Bound Printed Matter	$0.9101	$1.2271	$1.2449
Special Rate	$1.5685	$1.5895	$2.2677
Library Rate	$1.7161	$1.7593	$2.1246
Registry	$7.6346	$9.1146	$13.5165
Insurance	$1.8760	$2.4969	$4.1719
Certified	$1.4398	$2.0606	$2.6317
COD	$5.1458	$4.7301	$9.3407
Return Receipts	$1.2566	$1.8502	$1.7021
Money Orders	$0.8088	$1.0436	$0.8995

SUMMARY TABLE 2
Mark-Up Comparison

Mail Product	Own-Price Elasticity	R97-1 Index % Mark-Up	Ramsey Pricing % Mark-Up
First-Class Letters	-0.229	85.9	100.0
First-Class Cards	-0.852	61.3	37.1
Priority Mail	-0.819	81.0	22.5
Express Mail	-1.565	69.1	50.8
Periodicals In-County	-0.142	3.9	50.0
Periodicals Nonprofit	-0.236	6.5	50.0
Periodicals Classroom	-0.407	6.3	50.0
Periodicals Regular	-0.148	6.8	100.0
Standard Regular	-0.570	44.5	35.2
Standard ECR	-0.808	112.1	15.0
Standard Nonprofit	-0.162	25.9	17.6
Standard NP ECR	-0.162	59.2	7.5
Parcel Post	-1.230	10.7	13.9
Bound Printed Matter	-0.392	34.8	36.7
Special Rate	-0.296	8.8	55.2
Library Rate	-0.654	5.7	27.6
Registry	-0.246	18.1	75.1
Insurance	-0.179	45.7	143.4
Certified	-0.289	23.1	57.3
COD	-0.192	12.0	121.1
Return Receipts	-0.451	41.8	30.5
Money Orders	-0.430	53.6	32.4
Overall		67.6	63.7

14. Summary Table 3 shows that the Ramsey rates provide a $1,272 million increase in consumer surplus relative to the R97-1 Index rates.

Summary Table 3 shows the impact of the Ramsey prices on mailer consumer surplus, relative to both the R97-1 Index prices and the before-rates prices. The change in consumer surplus is a measure of the dollars gained or lost by mailers due to a price change, taking account of changes in both mailer expenditures and mail volumes. Summary Table 3 shows that in aggregate, the Ramsey prices yield $1,272 million more total consumer surplus than the R97-1 Index prices. The gain from Ramsey pricing occurs even though both the Ramsey and R97-1 Index rate schedules generate the same level of net revenues (contribution) for the Postal Service.

The overall gain of $1,272 million is approximately equal to two percent of the total GFY 2001 revenue of the 22 products considered in this testimony. The gain is equal to almost five percent of the GFY 2001 net revenue of $26,078 million.

SUMMARY TABLE 3
Changes in Consumer Surplus

Mail Product	R97-1 Index Price	Ramsey Price	Change in Consumer Surplus (millions)
First-Class Letters	$0.3442	$0.3704	($2,611.1)
First-Class Cards	$0.2111	$0.1794	$170.3
Priority Mail	$4.4382	$3.0037	$2,025.3
Express Mail	$11.2503	$10.0346	$132.1
Periodicals In-County	$0.0979	$0.1414	($36.3)
Periodicals Nonprofit	$0.1881	$0.2650	($149.4)
Periodicals Classroom	$0.2692	$0.3798	($5.5)
Periodicals Regular	$0.2927	$0.5482	($1,758.6)
Standard Regular	$0.2407	$0.2251	$616.6
Standard ECR	$0.1594	$0.0864	$3,075.5
Standard Nonprofit	$0.1450	$0.1355	$107.4
Standard NP ECR	$0.1163	$0.0785	$106.0
Parcel Post	$3.1547	$3.2448	($32.7)
Bound Printed Matter	$1.2271	$1.2449	($8.6)
Special Rate	$1.5895	$2.2677	($133.9)
Library Rate	$1.7593	$2.1246	($9.8)
Registry	$9.1146	$13.5165	($46.5)
Insurance	$2.4969	$4.1719	($69.4)
Certified	$2.0606	$2.6317	($147.1)
COD	$4.7301	$9.3407	($15.7)
Return Receipts	$1.8502	$1.7021	$32.0
Money Orders	$1.0436	$0.8995	$31.3
Total			$1,272.0

OUTLINE OF TESTIMONY AND SUPPORTING DOCUMENTS

My testimony is organized as follows: Chapter 1 explains why postal rates must be set above marginal (or volume variable per piece) costs, and shows how to properly measure the burden imposed on mailers by the need to set product prices above product costs. Chapter 2 presents the theory of Ramsey pricing and illustrates how Ramsey pricing minimizes the burden on mailers. Chapter 3 presents the 22 products included in the Ramsey pricing model and discusses the data needed to calculate the Ramsey prices of these products. In Chapter 4, a non-Ramsey after-rates price schedule is developed based on the Postal Rate Commission's (PRC) recommended mark-up index in the R97-1 case. The R97-1 Index after-rates schedule is used as a comparison to the Ramsey prices. Chapter 5 presents the Ramsey prices, compares them to the non-Ramsey rate schedule, and discusses reasons why the Ramsey prices are higher or lower than the prices based on the PRC's R97-1 mark-ups index. In Chapter 6, the increase in consumer surplus (gain to mailers) from Ramsey prices is calculated and analyzed. Chapter 6 also compares other postal rate schedules in terms of their impact on consumer surplus. Chapter 7 presents some brief conclusions.

In addition to the main testimony, one library reference provides supporting documentation.

LR-I-156: Computer Program Related to Testimony of Witness Bernstein presents the computer algorithm for calculating the Ramsey prices and the other price schedules presented in this testimony. Included in this library reference is a computer disk of the data used in a LOTUS spreadsheet and the Ramsey price computer program in MATLAB. In addition, the present testimony on occasion makes reference to the Ramsey pricing formulas that are derived in the library reference of my R97-1 Testimony, LR-H-164, Docket No. R97-1.

Chapter 1: Introduction

A. The Nature of the Problem

In rate cases, postal rates must be set in a way that generates revenues equal to total costs projected in a particular year, called a Test Year. Postal Service costs can be decomposed into costs that are volume variable and costs that are non-volume variable. Volume variable costs are costs that are caused by a change in the volume of a particular mail product. Volume variable cost per piece is essentially equal to marginal cost, which is defined as the additional cost associated with a one piece increase in volume. Economic efficiency is advanced when product price is set equal to product marginal cost. If the Postal Service were to set the price of each of its products equal to each product's marginal cost, the resulting revenues would be sufficient to offset the agency's volume variable costs. However the revenues would not be sufficient to also offset the agency's non-volume variable costs. Therefore, postal rates must be set above marginal cost to generate revenues equal to total costs in the Test Year.

A price above marginal cost imposes a burden on consumers. Given that there are any number of postal rate schedules that could yield total revenues equal to total costs, consideration of the burden imposed on consumers by any particular set of rates is important. The remainder of this chapter defines the burden on consumers from above marginal cost pricing and relates that burden to the net revenue that must be earned for total revenues to match total costs.

B. The Burden on Consumers

1. Burden Defined

The burden on consumers from a price greater than marginal cost is composed of two interrelated costs. The first component of the burden is equal to the additional expenditures consumers make to purchase goods at price P instead of at some lower

price, M, equal to marginal cost. This burden can be expressed as [P - M]·V(P) where V(P) is the quantity of goods purchased at price P. For example, if marginal cost is $10 and at a price of $15 consumers purchase 900 units of the good, then consumers paid ($15 - $10)·900, or $4,500 more for those 900 units than they would have had to pay if price were equal to the marginal cost of $10.

There is a second cost imposed on consumers from a higher price. If price is $15 instead of $10, the quantity of goods that consumers purchase declines. As a result consumers lose the net benefit of those goods not consumed due to the higher price.

Before defining the net benefit of consumption, it is important to understand that the full burden on consumers cannot be measured simply by the additional expenditures caused by the price increase. To see this, suppose that price were so high that consumers choose not to buy any of the good. In this case, volume is zero and expenditures are zero. Considering only this component of the burden on consumers would imply that there is no harm to consumers from a price so high that consumption is zero. Clearly this is not true. The harm to consumers must also take account of the adverse impact of a decline in consumption.

2. Burden is Equal to Loss of Consumer Surplus

The burden on consumers from an increase in price must take account of the increase in their expenditures and the decrease in their consumption. Economists refer to this combined burden as the loss of consumer surplus. Consumer surplus is a measure of the net benefit from purchasing a product. It is defined as the difference between consumers' value of a product and the price that consumers must actually pay. For example, if a consumer values a product at $15, but can purchase that product at a price of only $10, then the consumer's net benefit derived from the purchase of this one product, or the consumer surplus, is $5 ($15 value for a price of $10).

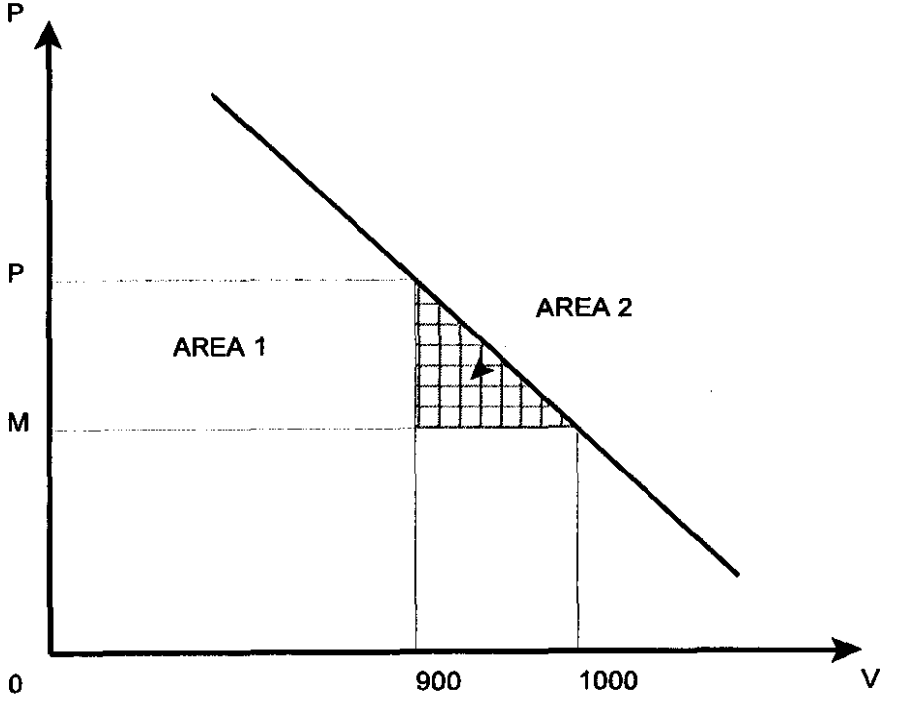
The value that consumers place on a product is measured by the demand curve for that product. A demand curve shows the quantity of a product that consumers will purchase at different prices. It also shows the value that consumers place on different quantities because consumers will only purchase a good if the value is at least equal to or greater than the price. For example, if consumers purchase 900 units of a good at a price of $15, it means that 900, and only 900 units of that good have a value to consumers of at least $15. The fact that consumers do not purchase 901 units of the good implies that the 901st unit of output has a value less than $15.

That the 901st unit of output has a lower value to consumers than the 900th unit of output is central to the concept of diminishing marginal value of consumption. Diminishing marginal value means that each additional unit of consumption has less value than the previous unit. Diminishing marginal value explains why consumers purchase more when price declines. If price were to fall from $15 to $10 consumption would increase from 900 units to, say, 1,000 units. The fact that consumers purchase 100 more units of the good when the price falls to $10 implies that those 100 additional units have a value at least equal to $10 but less than $15.

Figure 1 shows a demand curve consistent with the data in the previous discussion. At a price of $10, 1,000 units of the good are consumed. At a price of $15, 900 units are consumed. The burden on consumers resulting from an increase in price from $10 to $15 is represented by the two shaded areas in Figure 1. AREA 1 is equal to the added expenditures for the 900 goods consumed at the higher price, or ($15 - $10)·900 = $4,500. AREA 2 represents the lost net value of the 100 units that are not consumed at the higher price. With a linear demand curve, that area is calculated as ½[$15 - $10]·[1,000 - 900],

FIGURE 1

Loss of Consumer Surplus from Above Marginal Cost Pricing



or $250. Thus, the total harm to consumers from the rise in price from $10 to $15 is $4,750, equal to the $4,500 in additional expenditures for the 900 units that consumers purchase at the higher price of $15, plus the $250 of lost net value of those units consumers do not purchase as a result of the increase in price from $10 to $15.

The shaded areas in Figure 1 represents the loss in consumer surplus resulting from the rise in price. The loss in consumer surplus is the burden on consumers from the rise in price, reflecting the combined impact of the rise in price and the decline in consumption, as shown by the two shaded areas in Figure 1.

3. Burden on Consumers is Not Measured by Mark-Up

Suppose two products, A and B, each have marginal cost equal to $10. The price of product A is $15 and 900 units are purchased. The price of product B is $14.50 and 1,000 units are purchased. At first glance, it would appear that the burden imposed on consumers of good A is greater than the burden imposed on consumers of good B. Good A is priced 50 percent above its marginal cost, while good B is priced 45 percent above its marginal cost. But mark-up, the percentage by which price exceeds marginal cost, is not the proper measure of the burden on consumers. The proper measure of the burden on consumers is the loss of consumer surplus. The first part of this loss is the additional expenditures due to the higher price, measured as $[P - M]\cdot V(P)$. In market A, this is equal to $[\$15 - \$10]\cdot 900$, or $4,500. In market B, this is equal to $[\$14.50 - \$10]\cdot 1{,}000$, also equal to $4,500. Considering only this component, it now appears that the burdens in the two markets are equal. But the second component of the burden, the loss in consumer surplus due to the decline in consumption, must also be included.

Suppose that at a price equal to marginal cost of $10, 1,000 units of good A would be purchased, while 1,400 units of good B would be purchased. In other words, the demand curve for good A would include a point with price equal to $10 and volume equal

to 1,000, while the demand curve for good B would include a point with price equal to $10 and volume equal to 1,400. Assuming for simplicity that the demand curves for goods A and B are linear, the net value of the lost consumption in market A is equal to ½·[$15 - $10]·[1,000 - 900] or $250. The net value of lost consumption in market B is equal to ½·[$14.50 - $10]·[1,400 - 1,000] or $900.

Consequently, the loss of consumer surplus (the burden on consumers) in the market for good A is $4,750 ($4,500 plus $250) while the loss of consumer surplus in the market for good B is $5,400 ($4,500 plus $900). The higher burden in the market for good B occurs despite its lower mark-up because the rise in price above marginal cost causes the consumption of good B to fall more than the consumption of good A.

Table 1 summarizes the results of the previous discussion.

Table 1
Calculation of the Burden on Consumers when Price exceeds Marginal Cost

	Good A	Good B
Price: (P)	$15.00	$14.50
Marginal Cost: (M)	$10.00	$10.00
Percentage Mark-up: [P - M]/M	50.0%	45.0%
Volume at Price: V(P)	900 units	1,000 units
Additional Expenditures at P: (AREA 1 of Burden)	[$15 - $10]·900 = $4,500	[$14.50 - $10]·1000 = $4,500
Volume at Marginal Cost: V(M)	1,000 units	1,400 units
Lost Units of Consumption	100 units	400 units
Lost Net Value of Consumption (AREA 2 of Burden)	½·[$15 - $10]·[100] = $250	½·[$14.50 - $10]·[400] = $900
Total Burden on Consumers (Area 1 + Area 2)	**$4,750**	**$5,400**

C. The Burden on Consumers and Net Revenue

Net revenue is equal to total revenue (measured, for simplicity, as price times volume) minus total marginal costs (measured, for simplicity, as marginal cost times volume). Thus, net revenue can be expressed as $[P - M]\cdot V(P)$. Raising net revenue requires that price be set above marginal cost. Regarding the Postal Service, net revenue must be raised to offset the agency's common costs to satisfy the break-even requirement. Specifically, the total net revenue that must be raised (the net revenue requirement) from all Postal Service products must equal total non-marginal costs.

The above expression for net revenue is identical to the first of the two components of the burden on consumers from setting price above marginal cost. In other words, $[P - M]\cdot V(P)$ represents an unavoidable burden on consumers, necessary to satisfy the break-even requirement of the firm. The second component of the burden on consumers -- the lost net value of goods not consumed -- does not provide net revenue to the firm. Goods not consumed represent revenues that are not earned. Thus, while the first component of the burden on consumers is captured by the firm and serves to satisfy the break-even requirement, the second component of the burden on consumers is an unmitigated loss -- called a dead-weight loss by economists.

Suppose the Postal Service has common costs of $9,000 that must be recovered through the pricing of goods A and B. In this case, net revenues -- the excess of revenues over marginal costs -- must equal $9,000 for the Postal Service to break even. Product price(s) must be set above marginal cost to raise the required net revenue. If consumption did not decline when price is raised above marginal cost, the net revenue requirement could be satisfied without any dead-weight loss. For example, if consumers would purchase 1,000 units of good A regardless of price, the price of good A could be set at $9 above its marginal cost and net revenues would equal the required $9,000. The burden

on consumers would be ($19 -$10)·100, or $9,000, exactly equal to the net revenues raised by the firm. There is no loss in consumer surplus from the lost net value of units not consumed at the higher price because, by assumption, consumption of good A does not decline when its price is raised. Moreover, with all net revenues raised from good A, the price of good B could be set equal to the marginal cost of good B and there would be no burden on consumers of good B from above marginal cost pricing. In this case, the total burden on consumers is only the unavoidable burden resulting from the need to raise $9,000 in net revenues.

In reality, consumption does decline when price rises, making it impossible to raise net revenues without some dead-weight loss and without some additional burden on consumers. Recalling the example discussed earlier, good A was priced at $15 and consumption was 9,000 units; good B was priced at $14.50 and consumption was 1,000 units. Net revenues were $4,500 from each good, or $9,000 in total, thereby satisfying a $9,000 net revenue requirement. The total burden on consumers was $10,150 comprised of $4,750 of lost consumer surplus in the market for good A and $5,400 of lost consumer surplus in the market for good B (see Table 1).

In the example considered, consumers bear a burden of $10,150 in order to satisfy a $9,000 net revenue requirement. An important question is: can prices be set in a way that satisfies the net revenue requirement and imposes the smallest possible burden on consumers? Yes, by applying the theory of Ramsey pricing.

Chapter 2: The Theory of Ramsey Pricing

A. The Ramsey Pricing Formula

Ramsey pricing is used to establish product prices of a multi-product firm that accomplish two goals: the prices minimize the burden imposed on consumers and the prices yield total revenues for the firm equal to the firm's total costs of production. The Ramsey pricing formula, presented below as equation (1) is derived in my library reference LR-H-164, Docket No. R97-1.

$$\sum_{j=1}^{N} \frac{P_j - M_j}{P_i} E_{ji} \frac{V_j}{V_i} = -k, \quad \text{for all } i. \tag{1}$$

In the case of only two products, i and j, the above equation can be re-written as:

$$\begin{aligned} \frac{P_i - M_i}{P_i} E_{ii} + \frac{P_j - M_j}{P_i} E_{ji} \frac{V_j}{V_i} &= -k \\ \frac{P_j - M_j}{P_j} E_{jj} + \frac{P_i - M_i}{P_j} E_{ij} \frac{V_i}{V_j} &= -k \end{aligned} \tag{2}$$

The prices of products i and j, P_i and P_j, respectively, must both satisfy the above equation.

1. Definitions of Ramsey Formula Variables

a. Marginal Cost (M)

The marginal cost of a product is defined as the change in product cost associated with a one unit increase in product volume. With respect to the Postal Service, the marginal cost of a product is derived from knowledge of the product's volume variable costs. By the methodology of Postal Service costing, product volume variable cost is equal

to product marginal cost multiplied by product volume. Therefore, marginal cost is equal to volume variable cost per piece, obtained by dividing product volume variable costs by product volume.

b. Own-Price Elasticity (E_{ii})

The own-price elasticity of a product is defined as the percentage change in volume that results from a one percent change in product price, holding all other relevant factors unchanged. For example, if a one percent increase in price causes the volume of product i to decline 0.5 percent, the own-price elasticity of product i is -0.5. Own-price elasticities are negative because of the inverse relation between product price and product volume – an increase in own-price is associated with a decrease in volume and a decrease in own-price is associated with an increase in volume, holding other factors unchanged.

The greater in magnitude is the own-price elasticity, the more sensitive is product volume to a change in its price. If the own-price elasticity of product i were -1.0 instead of -0.5, it would mean that a one percent increase in price would produce a one percent decline in volume instead of only a 0.5 percent decline in volume. A product with an own-price elasticity greater (more negative) than -1.0 is said to have elastic demand. A product with an own-price elasticity smaller (less negative) than -1.0 is said to have inelastic demand. Most mail products have inelastic demands though some are more inelastic (less price sensitive) than others. Formally, the own-price elasticity, E_{ii}, is equal to:

E_{ii} = %change in volume/% change in price

$$E_{ii} = [\Delta V_i/V_i]/[\Delta P_i/P_i] \quad (3)$$

c. Cross-Price Elasticity (E_{ji})

Cross-price elasticity, E_{ji}, measures the percentage change in the volume of product j in response to a one percent change in the price of product i, holding all other factors constant. Formally, the cross-price elasticity E_{ji} is equal to:

E_{ji} = %change in volume of product j/% change in price of product i

$$E_{ji} = [\Delta V_j/V_j]/[\Delta P_i/P_i] \quad (4)$$

Two products that are substitutes for one another will have a positive cross-price elasticity because an increase in the price of product i will lead to an increase in the volume of product j as consumers substitute product j for the now more expensive product i. Two products that are complements to one another will have a negative cross-price elasticity because an increase in the price of product i will reduce the consumption of both product i and its complementary product j. To the extent that cross-price elasticities exist between some postal products, those products are substitutes for one another and have positive cross-price elasticities. For example, a positive cross-price elasticity exists between First-Class cards and First-Class letters because an increase in the price of letters (holding the price of cards unchanged) would cause some mailers to substitute cards for letters. Following the same logic, a positive cross-price elasticity also exists between the volume of First-Class letters and the price of First-Class cards.

d. Volume (V)

The Ramsey pricing equation states that when a cross-price elasticity exists between two products, the Ramsey prices of these products are also affected by the product volumes. Product volume affects the Ramsey prices because with cross-price elasticities, a change in the price of one product affects the volume of the other product. As will be more fully discussed later, the change in volumes resulting from cross-price

effects has an effect on the revenues generated by the Ramsey prices. Since the Ramsey prices must yield revenues equal to total costs, the inter-relation between product prices and product volumes becomes an important consideration in establishing break-even Ramsey prices.

Another consideration regarding product volumes is that the volumes referred to in equation (1) are the volumes that occur at the Ramsey prices. That is, the Ramsey price of product i depends on the volume of product j which depends on the Ramsey price of product j which, in turn, depends on the volume of product i. This inter-relation between product prices and product volumes must be included in the calculation of the Ramsey prices.

e. The Ramsey Leakage Factor (k)

A final term in the Ramsey pricing equation is "k", known as the Ramsey leakage factor. Section B of this chapter provides a detailed description of the intuition and mathematics of the Ramsey leakage factor. Less formally, the leakage factor is a measure of how efficiently each product's price satisfies the break-even requirement. The Ramsey equation states that prices should be established so that the k value is the same for every product. This means that each product should be equally efficient in its contribution toward satisfaction of the break-even requirement. This concept will be explored more fully later in this chapter.

2. Inverse Elasticity Rule (IER)

A simplified version of Ramsey pricing is the Inverse Elasticity Rule (IER). IER pricing is identical to Ramsey pricing when the demands for the products that are to be priced are independent of one another, i.e., there are no cross-price elasticities between postal products. In this case, both E_{ij} and E_{ji} are equal to 0 in equation (2). Although the conditions for IER pricing do not hold empirically for all postal products, a review of the

Inverse Elasticity Rule provides the framework for an intuitive understanding of Ramsey pricing.

With cross-elasticities E_{ij} and E_{ji} equal to zero, the Ramsey pricing equation reduces to the Inverse Elasticity Rule (IER) formula, which states that the price each subclass of mail should satisfy the following equation.

$$-k = \frac{(P_i - M_i) E_{ii}}{P_i} \qquad (5)$$

$(P_i - M_i)/P_i$ will be hereafter referred to as the Ramsey mark-up, which differs from the mark-up measure described in Chapter 1 which was equal to $(P_i - M_i)/M_i$. However, in both cases, if price is equal to marginal cost, the mark-up is equal to zero, and as price increases above marginal cost both mark-up measures increase above zero.

3. Intuition of IER and Ramsey Pricing

The basic principle of IER pricing can be demonstrated by considering the pricing of two products with the same marginal costs but different own-price elasticities of demand. According to the IER formula the prices of the two products must be set to satisfy equation (1), specifically that the Ramsey mark-up times the own-price elasticity must be equal for both products. To ensure this equality, the product with the greater own-price elasticity must have a smaller Ramsey mark-up. Given that the marginal costs are the same in this case, it follows that the more elastic product will have a lower price than the less elastic product. Thus, the optimal Ramsey or IER price is inversely related to the own-price elasticity of the product. Elastic products should have lower prices (lower Ramsey mark-ups) and inelastic products should have higher prices (higher Ramsey mark-ups) in order to satisfy the IER equation.

B. Understanding the Leakage Factor k

1. An Illustration of Leakage

Figure 2 presents the demand curves for two postal products, i and j, assumed for simplicity as linear demand curves. Both products have constant marginal costs of $1 and the demand equations for postal product i (D_i) and product j (D_j) are:

$$V_i = 150 - 25 \cdot P_i$$

$$V_j = 120 - 10 \cdot P_j$$

where P is price of the product in dollars and V is volume demanded at price P. At a price of $2, as shown in Figure 2, 100 units are demanded of each product.

According to the above equations, a one dollar increase in the price of product i causes quantity demanded to decline by 25 units, whereas a one dollar increase in the price of product j causes quantity demanded to decline by only 10 units. Therefore, the demand for product i is more price elastic than the demand for postal product j. This result can also be seen by calculating the elasticities of demand for products i and j. Recalling the formula for own-price elasticity and noting that in a linear demand equation the coefficient on price equals $\Delta V/\Delta P$, the own-price elasticities of demand for products i and j are equal to

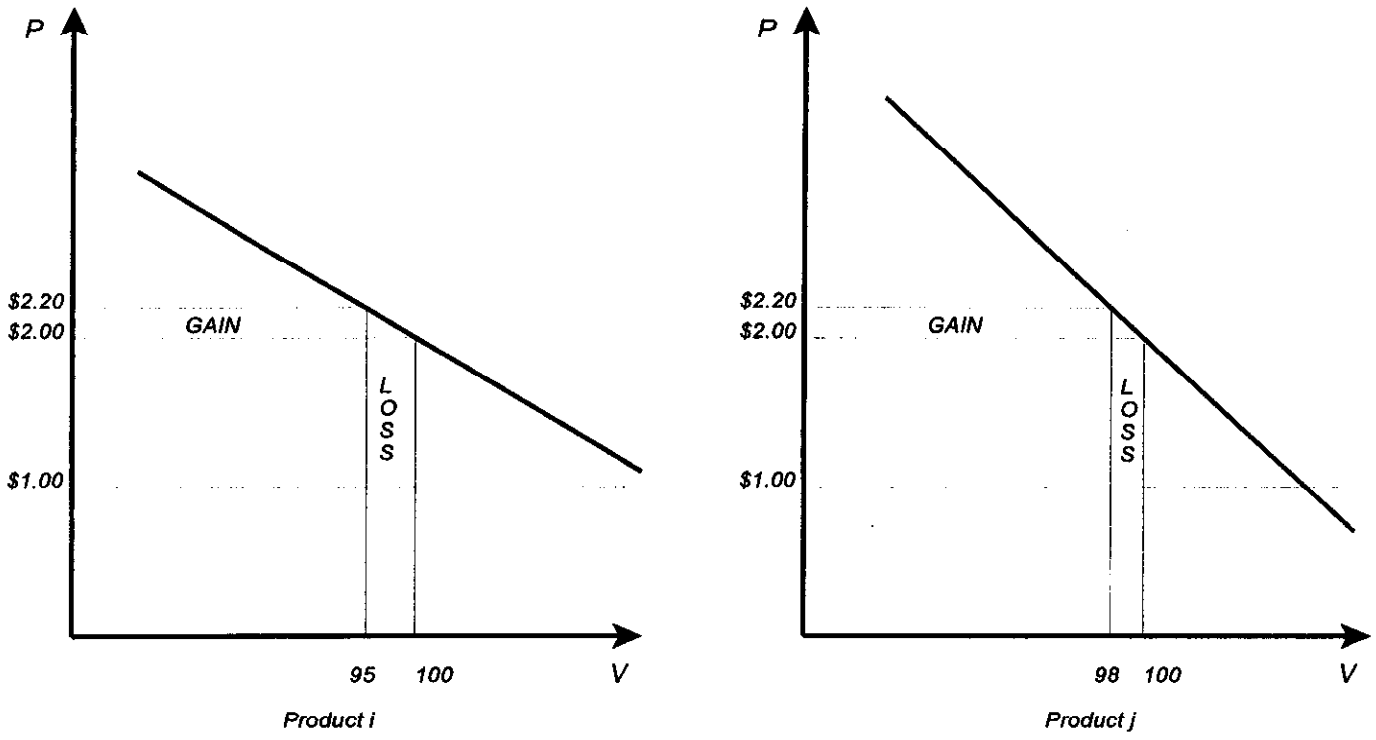
$$E_{ii} = [\Delta V_i/V_i]/[\Delta P_i/P_i] = -25 \cdot P_i/V_i = -25 \cdot 2/100 = -0.5$$

$$E_{jj} = [\Delta V_j/V_j]/[\Delta P_j/P_j] = -10 \cdot P_j/V_j = -10 \cdot 2/100 = -0.2$$

Figure 2 also shows the net revenues earned by the firm from products i and j, where net revenue is equal to $[P - M] \cdot V$. With both products having a constant marginal cost of $1, net revenues from each product are equal to $100 and total net revenues are equal to $200.

FIGURE 2

Comparing Leakage for Two Different Products



Suppose that the combined net revenues from products i and j are insufficient to cover the common costs of the Postal Service. To raise the required net revenue, the price of each product is increased from $2 to $2.20. The increase in price causes a decline in quantity consumed, with volume falling 5 units to 95 units for product i and falling 2 units to 98 units for product j. The smaller decline in product j volume reflects its lower own-price elasticity.

The increase in price from $2 to $2.20 yields an increase in net revenues from the units still consumed at the higher price, indicated by the areas labeled GAIN in Figure 2. At the same time, the increase in price causes a partially offsetting decline in net revenues that were previously earned at the lower price of $2, but are no longer earned on those units that are not consumed at the higher price of $2.20. This loss of net revenues is indicated by the areas labeled LOSS in Figure 2. The overall change in net revenues is the difference between GAIN and LOSS. Table 2 mathematically presents the same information shown in Figure 2.

Table 2
GAIN and LOSS Resulting from a Price Increase

Product i					
Price (P)	Cost (M)	Volume (V) 150 - 25•P	Net Revenue (P - M)•V	GAIN V•ΔP	LOSS (P - M)•ΔV
$2.00	$1.00	100	$100.00		
$2.20	$1.00	95	$114.00	+$19.00	-$5.00
Product j					
Price (P)	Cost (M)	Volume (V) 120 - 10•P	Net Revenue (P - M)•V	GAIN V•ΔP	LOSS (P - M)•ΔV
$2.00	$1.00	100	$100.00		
$2.20	$1.00	98	$117.60	$19.60	-$2.00

Table 2 shows that at a price of $2.20, the net revenue from product i is $114.00, equal to ($2.20 - $1.00) •95, representing a $14.00 increase in the net revenue that was earned at a price of $2.00. The source of the $14.00 increase is shown as the difference between a $19.00 GAIN (equal to an additional $0.20 on each of 95 units consumers) and a $5.00 LOSS (equal to the $1 of net revenue previously earned on each of 5 units no longer consumed at the higher price).

Table 2 also shows that for product j, net revenue at a price of $2.20 is $117.60. The $17.60 increase in net revenue is equal to the difference between a $19.60 GAIN and a $2.00 LOSS.

Note that although the price increases were identical in the two markets, the increase in net revenues in market i ($GAIN_i$) is much less than the increase in net revenues in market j ($GAIN_j$). The smaller increase in net revenues in market i is a direct result of the greater own-price elasticity of product i, which causes a much larger decline in volume when the price of good i is increased. Figure 2, therefore, illustrates one important aspect of the Ramsey or IER pricing. Raising the price of elastic products is a less effective method for raising net revenue because the volume of elastic products declines more as a result of a price increase.

2. GAIN, LOSS and the Leakage Factor k

A measure of the efficiency of raising net revenues is the ratio of the net revenues lost due to the decline in consumption to the net revenues gained due to the increase in price. From Table 2, the ratio of LOSS to GAIN is equal to:

$$\frac{LOSS}{GAIN} = \frac{(P - M)\bullet\Delta V}{V\bullet\Delta P} \qquad (6A)$$

Multiplying both the numerator and denominator by P and recalling that the own-price elasticity is equal to $[\Delta V/V]/[\Delta P/P]$ yields,

$$\frac{\text{LOSS}}{\text{GAIN}} = \frac{(P - M)\bullet\Delta V}{V\bullet\Delta P}\frac{P}{P} = \frac{E^*(P-M)}{P} = -k \qquad (6B)$$

which is exactly the expression for the leakage factor k in the IER formula. Thus, the k value of a product measures the effectiveness of raising additional net revenue from that product.

3. Leakage and the Burden on Consumers

Another way of expressing the efficiency of raising net revenues is to think of the overall gain in net revenues compared to the burden imposed on consumers. Recall from Figure 1 and Table 1 in Chapter 1 that the burden on consumers from an increase in price consisted of two areas. The first aspect of the burden on consumers (labeled AREA 1 in Figure 1) is the additional expenditures by consumers at the higher price, identical to the area GAIN in Figure 2. The second aspect of the burden on consumers is the lost net value of those goods not consumed, represented by the triangular AREA 2 in Figure 1. Although this second aspect of the burden on consumers is important, AREA 2 will tend to be much smaller than AREA 1, and the lost net value of consumption is a second-order effect on consumers. Therefore, ignoring this consideration, the burden on consumers is equal to the additional expenditures for those goods consumed at the higher price, identical to the GAIN in net revenues shown in Figure 2 and Table 2.

Consequently, one can measure the efficiency of raising net revenues as it relates to the burden, or the primary aspect of the burden, imposed on consumers. Recalling that the overall increase in net revenues is equal to GAIN minus LOSS, then a measure of the overall increase in net revenues per dollar of burden on consumers is:

$$\frac{\text{GAIN - LOSS}}{\text{GAIN}} = 1 - \text{LOSS/GAIN} = 1 - k$$

Thus, every dollar of burden imposed on consumers yields an overall increase in net revenues of 1 - k dollars. In turn, k dollars of net revenue "leak away" from the firm.

4. Desirability of a Constant k Across All Products

Figure 2 and Table 2 show that the increase in price from $2.00 to $2.20 imposes more leakage from the more elastic product i than the less elastic product j. The leakage value for product i, equal to the ratio of LOSS to GAIN is $5.00/$19.00 or 0.26. This means that for each dollar of additional burden imposed on consumers of product i from the increase in price, 74 cents of additional net revenue is earned, while 26 cents of leakage occurs. In contrast, the leakage value for product j is about 0.10, equal to $2.00/$19.60, meaning that for each dollar of additional burden on consumers of product j, about 90 cents of additional net revenue is earned, with only ten cents of leakage. Note that for both products leakage exists because increases in price lead to decreases in consumption. But the greater leakage for product i shows that raising the price of product i is a less efficient (more harmful to consumers) way of capturing an additional dollar of net revenue for the firm.

Another way of looking at the impact of different levels of leakage is to consider the change in the burden imposed on consumers associated with raising $1 of additional net revenues from product j and $1 less of net revenues from product i, so that total net revenues are unaffected. This change in consumer burden is given by the difference between the k values for products i and j. Since the k value for product i is 0.26 and the k value of product j is 0.10, transferring $1 of net revenues from product i to product k reduces the burden on consumers by $0.16 (0.26 minus 0.10). As long as the leakage values for any two products are not equal, the firm could raise the same total net revenue and lower the burden on consumers by raising the price of the low leakage product and lowering the price of the high leakage product.

Does this mean that the firm should continue to raise the price in market j and lower it in market i ad infinitum? No. As the price in market j is raised, additional price increases produce more leakage. The reduction in consumption caused by additional price increases becomes more costly because the net revenue $(P - M)\cdot\Delta V$ that is lost gets larger as P gets larger. Similarly, lowering the price in market i recaptures less and less net revenues because $(P - M)\cdot\Delta V$ declines as P declines. Thus, as P_j is raised, the leakage (k) in market j increases and as P_i is lowered, the leakage (k) in market i decreases. At some price combination, the leakages in the two markets will be equal (constant k).

How large a value this constant k must have depends on the total amount of net revenues that must be raised. The greater the required net revenues (the greater the common costs that must be covered), the greater is the constant k and the higher are the IER (or Ramsey) prices. But any increase in the net revenue requirement forces prices upward. IER (or Ramsey) prices raise the needed revenues in a method that imposes the smallest burden on consumers.

5. Leakage and Cross-Price Elasticities

If cross-elasticities of demand are not zero, then the full Ramsey formula is used. The important difference between IER pricing and Ramsey pricing is that Ramsey pricing takes into consideration the impact of a change in the price of one product on the demand for a substitute or complement product. That change in demand has effects on consumers of the substitute or complement good, as well as an effect on the net revenues earned by the producer.

Assume there is a product i with a given own-price elasticity, E_{ii}. The impact of cross-elasticities on leakage can be seen by comparing the IER and the full Ramsey formula, where the Ramsey formula includes a cross-price elasticity (E_{ji})between another product j and the price of product i.

$$\frac{P_i - M_i}{P_i} E_{ii} + \frac{P_j - M_j}{P_i} E_{ji} \frac{V_j}{V_i} \qquad (7A)$$

The first term in the Ramsey formula is identical to the IER formula and equals the leakage that results from an increase in the price of product i. The second term in the Ramsey formula can be re-written as shown below by substituting the formula for the cross-price elasticity of product j with respect to the price of product i.

$$\frac{P_j - M_j}{P_i} E_{ji} \frac{V_j}{V_i} = \frac{P_j - M_j}{P_i} \frac{\Delta V_j}{V_j} \frac{P_i}{\Delta P_i} \frac{V_j}{V_i} = \frac{(P_j - M_j)\ \Delta V_j}{V_i\ \Delta P_i} \qquad (7B)$$

The denominator of the second part of the Ramsey formula ($V_i \bullet \Delta P_i$) is the same as the denominator in the first part of the formula and in the IER formula. It is the GAIN in revenues resulting from the increase in price of product i. The numerator of the second part of the Ramsey formula ($P_j - M_j) \bullet \Delta V_j$ is the change in net revenues of product j that results from the increase in the price of product i. It is equal to the net revenues earned per unit of product j (price of j minus its marginal cost) multiplied by the change in volume of product j that results from the increase in the price of product i. If i and j are substitutes, then the increase in the price of product i causes an increase in the volume of product j and an increase in net revenues earned from product j. Therefore, the leakage of net revenue that occurs from the decline in the volume of product i (the first term of the Ramsey formula) is partially offset by an increase in net revenue from the substitute product j. Thus, holding the own-price elasticity of product i constant, the presence of a substitute product j reduces the leakage caused by an increase in the price of i. Under

Ramsey pricing, products with substitutes within the set of products to be priced will have higher mark-ups than products without such substitutes, *assuming the two products have the same own-price elasticity.*

6. Leakage and the Presence of Nonpostal Alternatives

The presence of nonpostal alternatives is included in the analysis of the gains, the losses, and the leakage that results from an increase in postal product price. In Figure 2, the demand curves for products A and B show the quantity demanded at different prices, holding all other factors constant. Included in these other factors are, among other things, the prices and consumer benefits of substitute and complement products. Therefore, the existence of substitutes, and the benefits that consumers may receive from purchasing substitutes, is imbedded in the demand curve for a product.

Suppose product A has a substitute product C. The loss of consumer surplus from an increase in the price of product A consists of two areas. One area is the additional expenditures that consumers make to purchase goods at the higher price. The fact that some consumers continue to buy product A after its price is raised means that product C is not a perfect substitute for product A. For those consumers who continue to buy product A, the higher price imposes a loss of consumer surplus equal to the price increase multiplied by the number of units consumed at the higher price, as measured by the demand curve.

The second area of the loss of consumer surplus is the lost net value of those units not consumed due to the higher price. With respect to this second area, suppose there is a consumer who is virtually indifferent to consuming product A at a price of $10 or consuming product C. This means that the consumer is willing to pay $10 for product A, but if the price were raised to $10.01, the consumer would purchase product C instead. If the price of product A were increased to $10.01, the loss of consumer surplus by this

consumer would be virtually zero. The loss is equal to the difference between what the consumer was willing to pay (something between $10.00 and $10.01) and the price actually paid ($10.00). The point is, to the extent that a substitute product exists, some consumers may be able to easily switch from consuming product A to consuming product C if there were an increase in the price of product A. This easy substitution of product C for product A is part of the demand curve for product A, which shows that even a very small increase in the price of A (from, say, $10.00 to $10.01) leads to a decline in consumption of product A.

Thus, the hypothetical increase in the price of product A from $10.00 to $10.01 imposes a one cent per unit loss of consumer surplus by those consumers who continue to purchase product A and virtually no loss of consumer surplus from consumers who no longer purchase product A. The above analysis, with explicit consideration of the availability of a substitute product C, is in no way different from the presentation earlier in my testimony.

7. Leakage in Competitive and Unregulated Monopoly Markets

Further understanding of the concept of leakage can be gained by examining the pricing conditions faced by competitive firms and by an unregulated monopolist. As part of the analysis, the basic IER pricing equation is re-written in terms of the ratio of price to marginal cost for each product to be priced.

$$P/M = E/(E + k)$$

a. Leakage Under Pure Competition

Under pure competition, price equals marginal cost where marginal cost includes a normal profit margin for the firm. A mark-up of price above marginal cost is not sustainable under pure competition because other firms could set price at marginal cost and the firm charging the above marginal cost price would see its quantity sold go to zero.

In terms of the above equation, price equals marginal cost when the leakage factor k is equal to 0. Thus, under perfect competition, there is no leakage.

b. Leakage for an Unregulated Monopoly

Consider now, the pricing strategy for an unregulated profit-maximizing monopolist. The monopolist will raise prices above marginal costs until the point in which profits, analogous to net revenues, are maximized. The pricing formula for a profit maximizing monopolist, not derived here but commonly found in any micro-economics text book is:

$$P/M = E/(E + 1)$$

The above formula is identical to the IER pricing formula when the leakage factor k is equal to 1. Recalling that leakage equals the ratio of net revenues lost to net revenues gained from a price increase, a leakage value of 1 states that a profit-maximizing monopolist will continue to raise price as long as the price increase loses less net revenues (or profits) than it gains.

Thus, as prices are increased above marginal cost (the pure competitive solution), the leakage factor k increases from 0 until (in the unregulated monopoly solution) it reaches 1. Additional price increases would push the leakage factor above 1, meaning that the price increase would lose more net revenues (profits) than it gains.

Leakage factors of 0 and 1, therefore, form the bounds between the purely competitive market and the unregulated profit-maximizing monopolist.

C. An Illustration of Demand Elasticities and Postal Rate-Making

The principles behind Ramsey pricing can be seen by considering a simple postal system with only two products, both of which can be produced at a marginal cost of 20 cents. Assume that at a price of 30 cents, the volume of each product is 1,000 million pieces, and that the resulting net revenues exactly offset the system's non-volume variable

cost. Table 3A shows these conditions, with volumes and net revenues measured in millions.

Table 3A

Product	Marginal Cost	Price	Volume	Net Revenue
A	$0.20	$0.30	1,000	$100
B	$0.20	$0.30	1,000	$100
Total			2,000	$200

Now suppose that postal rate-makers wish to lower the price of product A by 10 percent (to 27 cents). At first glance, it would appear that the 3 cent decrease in the price of product A could be "paid for" by a 3 cent increase in the price of product B. But the exact increase in the price of product B necessary to offset the decrease in the price of product A depends on the elasticities of demands of the two products.

Assume that product A has an own-price elasticity of -0.2 and product B has an own-price elasticity of -0.8. Table 3B shows that a 3 cent decrease in the less elastic product A and a 3 cent increase in the more elastic product B results in an overall decrease in net revenue.

Table 3B

Product	Marginal Cost	Price	Volume	Net Revenue
A (E = -0.2)	$0.20	$0.27	1,020.0	$71.4
B (E = -0.8)	$0.20	$0.33	920.0	$119.6
Total			1,940.0	$191.0

Net revenues decrease because of the substantial decline in the volume of product B, a direct result of its relatively high own-price elasticity. In order to offset this volume loss

(and the smaller increase in net revenues stemming from the volume loss), the increase in the price of product B must be greater than the decrease in the price of product A.

Table 3C shows that to keep net revenues unchanged at $200 million, the 10 percent decrease in the price of less elastic product A would require a 15.7 percent increase (to $0.3471) in the price of more elastic product B. Furthermore, consumer surplus calculations reveal that the increase in the price of product B causes a $44.1 million decline in consumer surplus, while the decrease in the price of product A causes only a $30.3 million increase in consumer surplus. Therefore, overall consumer surplus declines by $13.8 million because the harm imposed on users of product B exceeds the gain to users of product A.

Table 3C

Product	Marginal Cost	Price	Volume	Net Revenue
A (E = -0.2)	$0.20	$0.27	1,020.0	$71.4
B (E = -0.8)	$0.20	$0.3471	874.5	$128.6
Total			1,894.5	$200.0

As an alternative, suppose that rate-makers had chosen to reduce the price of the more elastic product B by 10 percent. Table 3D shows that the price of product A would need to be increased by just 8.9 percent to offset the 10 percent decrease in the price of product B. Consumer surplus calculations show that users of product B would gain $31.2 million while users of product A would lose $26.4 million, relative to the initial situation shown in Table 3A. Thus, there is a net increase in total consumer surplus of $4.8 million. This increase compares to the $13.8 million decrease in consumer surplus (an $18.4 million difference) that results when the price of less elastic product B is lowered.

Table 3D

Product	Marginal Cost	Price	Volume	Net Revenue
A (E = -0.2)	$0.20	$0.3267	982.2	$124.4
B (E = -0.8)	$0.20	$0.27	1,080.0	$75.6
Total			2,062.2	$200.0

Note that none of the prices shown above are Ramsey (or IER) prices. However, the prices in Table 3D are more closely aligned to Ramsey prices because there is a lower mark-up on the relatively elastic product and a higher mark-up on the relatively inelastic product. This leads to a lower system-wide mark-up (since net revenues are spread over greater volume) and an overall increase in total consumer surplus.

D. Ramsey Pricing with Competing Nonpostal Firms

1. Statement of the Problem

Postal price changes can also affect consumers of products that compete with the Postal Service. For example, the demand equations for Priority Mail, Express Mail, and parcel post include cross-price elasticities with competing nonpostal firms, UPS and Federal Express. These elasticities measure the impact of changes in these competing firms' prices on the volumes of the related postal products but, by extension, it can be concluded that changes in the prices of postal products can affect competing firms' volumes. Elasticities with competing nonpostal products can be included in a Ramsey pricing model because changes in Postal Service rates can affect the demand for competing firms' products and the firms' profits. Thus, the Ramsey pricing task could be re-stated as the maximization of total producer and consumer surplus, which would then include not only the producer and consumer surplus of the Postal Service and its users but also the producer and consumer surplus associated with competing products.

2. Ramsey Price Equations with Competing Firms

A Ramsey pricing equation including competition with nonpostal firms (often referred to as Ramsey pricing with rivalry) is presented below. Product 1 is produced by the Postal Service and product 2 is produced by a nonpostal firm. [For simplicity, cross-elasticities between postal products are ignored in this analysis].

(8a)

$$\left(\frac{P_1-M_1}{P_1}\right)\left[E_{11}+E_{12}\left(\frac{dP_2}{dP_1}\frac{P_1}{P_2}\right)\right] + (1-k)\left(\frac{P_2-M_2}{P_2}\right)\left[E_{21}\frac{R_2}{R_1}+E_{22}\left(\frac{dP_2}{dP_1}\frac{P_1}{P_2}\right)\frac{R_2}{R_1}\right] = -k$$

where

P_1 is the price of the postal product;

M_1 is the marginal cost of the postal product;

E_{11} is the own-price elasticity of the postal product;

E_{12} is the cross-price elasticity of the postal product with respect to the price of the nonpostal product;

dP_2/dP_1 is the change in the price of the nonpostal product in response to a change in the price of the postal product;
P_2 is the price of the nonpostal product;

M_2 is the marginal cost of the nonpostal product;

E_{21} is the cross-price elasticity of the nonpostal product with respect to a change in the price of the postal product;

R_2 and R_1 are the revenues of the nonpostal and postal products, respectively;

E_{22} is the own-price elasticity of the nonpostal product; and

k is the Ramsey leakage constant.

A first observation is that if the nonpostal firm is pricing at marginal cost, which includes a normal profit for the private competing firm, then the Ramsey equation reduces to the Inverse Elasticity Rule. Note that this condition requires that the response of the nonpostal firm to a change in postal prices (dP_2/dP_1) is zero, which it will be under conditions in which the nonpostal firm is operating in a market with marginal cost pricing.

If cross-elasticities exist and the nonpostal firm is pricing above its marginal cost, then the Ramsey price with rivalry may differ from the Ramsey price in which rivalry is not considered. The direction of the departure depends critically on the response of the nonpostal firm to changes in the price of the postal product. Assume for the moment that the price of the nonpostal firm does not change in response to a change in the price of the postal product (i.e.,$dP_2/dP_1 = 0$). In this case, the Ramsey price of the postal product with rivalry will be greater than when rivalry is not considered. This can be seen by re-writing the above equation with dP_2/dP_1 equal to 0:

(8b)

$$\left(\frac{P_1-M_1}{P_1}\right)E_{11}+(1-k)\left(\frac{P_2-M_2}{P_2}\right)E_{21}\frac{R_2}{R_1}=-k$$

$[(P_1 - M_1)/P_1]E_{11}$ is the familiar term from the Inverse Elasticity Rule (IER). The other term on the left-hand side of the equation has a positive sign since P_2 is assumed greater than M_2, and E_{21} is assumed greater than zero. As a consequence, the Ramsey price of the postal product (P_1) will have to be higher than in the case without rivalry to offset the positive value of the other term and maintain equality with k.

The intuition of this result is that increases in the price of the postal product increase demand for the nonpostal product (because of the cross-elasticity effect) and with nonpostal price above marginal cost, this increase in demand increases the profits of the

nonpostal firm. These profits would be included as part of the total social welfare from Ramsey pricing. Note that "profits" here refers to "economic profits" defined as profits above what would be expected from a normal operation. If the economic profits are small, the effect on Ramsey prices of the nonpostal products will be small. If the nonpostal firm's economic profits are substantial, then the Ramsey price of the postal product could be meaningfully affected. However, it must be noted that if the nonpostal firm's price significantly departs from its marginal cost, then there is an important loss of economic efficiency in the market for the nonpostal product.

The foregoing discussion shows that when the nonpostal firm is pricing above marginal cost ($P_2 - M_2 > 0$) and the nonpostal firm's price is unchanged by a change in the postal product price ($dP_2/dP_1 = 0$), the Ramsey price with rivalry will be above the price without rivalry. The opposite result can occur if the nonpostal price is positively related to changes in the postal price ($dP_2/dP_1 > 0$), meaning, for example, that an increase in the price of a postal product contributes to the increase in the price of the nonpostal competing product. Under these conditions, the Ramsey pricing equation includes all terms with dP_2/dP_1. As compared with the equation without this condition, the following terms are included on the left-side of Equation (8b).

$$\left(\frac{P_1 - M_1}{P_1}\right)\left[E_{12}\left(\frac{dP_2}{dP_1}\frac{P_1}{P_2}\right)\right] + (1-k)\left(\frac{P_2 - M_2}{P_2}\right)\left[E_{22}\left(\frac{dP_2}{dP_1}\frac{P_1}{P_2}\right)\frac{R_2}{R_1}\right]$$

If one assumes for simplicity that the postal product and the nonpostal product have approximately the same price, then P_1/P_2 approximately equals 1. Eliminating this term yields the following additional terms resulting from assuming $dP_2/dP_1 > 0$:

$$\left(\frac{P_1 - M_1}{P_1}\right)\left[E_{12}\left(\frac{dP_2}{dP_1}\right)\right] + (1-k)\left(\frac{P_2 - M_2}{P_2}\right)\left[E_{22}\left(\frac{dP_2}{dP_1}\right)\frac{R_2}{R_1}\right]$$

The first term above is positive, but the second term is negative owing to the fact that E_{22} (the own-price elasticity of the nonpostal firm) is negative. It would be quite easy for the sum of the above terms to be negative (and meaningfully so), especially if one considers the case where the competing firm is UPS whose revenues (R_2) are many times the revenues of either Priority Mail or parcel post (R_1).

Two conclusions from the above analysis are:

1) Ramsey prices of postal products including rivalry will be less if $dP_2/dP_1 > 0$ than if $dP_2/dP_1 = 0$,

2) Ramsey prices of postal products including rivalry could be less than the Ramsey prices when rivalry is not considered.

The intuition of the second result is as follows. With $dP_2/dP_1 > 0$, a change in postal product price causes a change in the same direction (though not necessarily of equal magnitude) in the price of the nonpostal product. If the nonpostal product price is above its marginal cost (which is a necessary condition for any of this analysis to matter), then there is a loss of efficiency in the nonpostal product market. If the nonpostal price moves in the same direction as the postal product price (i.e., $dP_2/dP_1 > 0$), then *lowering* the postal product price will produce a decline in the nonpostal product price. This decline in the nonpostal price will move that price closer to its marginal cost, thereby increasing total social welfare. This point is especially true if the revenues of the nonpostal product are much larger than the revenues of the competing postal product.

Ultimately, the Ramsey prices of postal products are affected by cross-elasticities with nonpostal products only if the nonpostal firms are pricing above marginal cost. Both

Federal Express and UPS operate in competitive markets with free entry, economic conditions that lead to marginal cost pricing. Furthermore, both these firms are free to and are known to negotiate rates with particular customers that are lower than the firms' published rates. It can be presumed that the lowest rate that either firm would negotiate with a customer is the firm's marginal cost. Moreover, the business on which these firms negotiate lower rates is likely to be the deliveries that they might otherwise lose to a competitor such as the Postal Service. The same reasoning applies to other firms that may be competing with the Postal Service but are not explicitly included in the demand equation for any postal product. Private firms operating in competitive markets with free entry can be expected to be pricing at marginal cost. Therefore, the Ramsey model without cross-elasticities of nonpostal firms is likely to yield results quite similar to those that would result from a model with nonpostal firms.

Chapter 3: Data Required for the Calculation of Ramsey Prices

The Ramsey pricing formula, reprinted below, shows that in order to calculate Ramsey prices, information is needed on marginal costs (M_j), price elasticities (E_{ji}), and volumes (V_j and V_i) of each subclass or special service. In addition, a break-even revenue requirement, which determines the value of the leakage factor k, must be satisfied. The present chapter discusses each of these necessary inputs as they relate to the calculation of Ramsey prices of postal products.

$$\sum_{j=1}^{N} \frac{P_j - M_j}{P_i} E_{ji} \frac{V_j}{V_i} = -k, \quad \text{for all } i. \qquad (1)$$

A. Mail Products Included in Ramsey Price Calculations

The present testimony calculates Ramsey prices for the mail subclasses and special services presented in Table 4 below. Table 4 includes all domestic mail subclasses and special services for which demand elasticities have been estimated. Included in Table 4 are six preferred subclasses: Periodicals In-county, Periodicals Nonprofit, Periodicals Classroom, Standard A Nonprofit, Standard A ECR Nonprofit, and Library mail. Ramsey prices are not calculated for these mail subclasses. Instead, each of the preferred subclasses is assigned a mark-up over marginal cost equal to one-half the Ramsey mark-up for the corresponding regular subclass, following the requirements for the pricing of nonprofit subclasses set forth in the Revenue Forgone Reform Act. However, because the nonprofit subclasses yield net revenues and help satisfy the break-even requirement, they are included in the Ramsey pricing model even though their prices are constrained.

Table 4
Mail Products Included in the Ramsey Pricing Model

First-Class Letters, Flats, and Parcels
First-Class Cards
Priority Mail
Express Mail
Periodicals In-County Mail
Periodicals Nonprofit Mail
Periodicals Classroom Mail
Periodicals Regular Rate Mail
Standard A Regular Mail
Standard A Enhanced Carrier Route Mail
Standard A Nonprofit Mail
Standard A Enhanced Carrier Route Nonprofit Mail
Standard B Parcel Post
Standard B Bound Printed Matter
Standard B Special Rate Mail
Standard B Library Rate Mail
Registry
Insurance
Certified
C.O.D.
Return Receipts
Money Orders

B. Own-Price and Cross-Price Elasticities

1. Elasticities Used in Ramsey Price Calculations

Ramsey prices depend on own- and cross-price elasticities of demand. The price elasticities used in the Ramsey price calculations are the long-run price elasticities presented in this case by Mr. Thress (USPS-T-7), and Dr. Musgrave (USPS-T-8) for Priority and Express Mail. These elasticities are obtained from volume demand equations estimated using quarterly data. Included in the set of explanatory variables are the real price paid by the mailer in the current quarter and up to three lagged postal quarters. The inclusion of price lags in the demand equation reflects the fact that mailer response to a change in postal rates occurs over a period of time. The price elasticities used in the Ramsey price formula are the long-run price elasticities equal to the sum of the current and lagged elasticities.

In the econometric estimation of the price elasticities of First-Class letters and cards, and Standard A Regular and Nonprofit mail, price is measured as postage price plus user costs. User costs are costs borne by the mailer to satisfy worksharing requirements. The estimated price elasticity is the percentage change in volume associated with a one percent change in price including user cost. To be consistent with the demand elasticities estimated for these subclasses, the Ramsey price is the Ramsey postage price plus user costs. The Ramsey price reported in this testimony, however, is the Ramsey postage price obtained by subtracting the user cost from the Ramsey price including user costs.

My library reference, LR-H-164, Docket No. R97-1 shows that measuring the Ramsey price with user costs maintains consistency with the demand equations which also include user costs. It is worth noting that the impact of user costs on the Ramsey postage prices is quite small.

2. Subclass Elasticities for First-Class Mail

Ramsey prices are calculated for mail subclasses and special services. The Postal Service demand equations include two subclasses in which separate elasticities are estimated for categories within the subclass. Separate demand equations are estimated for single-piece and workshared letters within the First-Class letter subclass and for stamped postal cards and private postal cards within the First-Class cards subclass.

LR-I-156 presents calculations of the subclass own-price and cross-price elasticities for First-Class letters and First-Class cards. For the most part, these calculations involve taking the weighted average (using before-rates volumes as weights) of the price elasticities of the individual categories. For example, the estimated own-price elasticity of private cards is -0.859648 and the estimated own-price elasticity of stamped cards is -0.761362. The subclass own-price elasticity is a volume weighted average of the category elasticities, with private cards having a weight of 0.920174 and stamped cards having a weight of 0.079826. Therefore, the own-price elasticity of the First-Class cards subclass is -0.851802.

The calculation of the subclass elasticity for First-Class letters is complicated by the presence of a discount elasticity between single-piece and workshared letters. The discount elasticity is relevant because an across-the-board increase in the price of the First-Class letter subclass causes an increase in the price of single-piece letters, the price of workshared letters, and the workshare discount. The subclass volume response, which yields the subclass own-price elasticity, includes price and discount effects.

A one percent increase in the price of First-Class letters leads to a one percent increase in the price of single-piece letters, a one percent increase in the price of workshared letters, *and* a one percent increase in the workshare discount. Therefore, the percentage change in the volume of single-piece letters will be equal to the sum of the

own-price and discount elasticities. Similarly, the percentage change in the volume of workshared letters will be equal to the sum of the workshare own-price and discount elasticities. The subclass own-price elasticity, in turn, is the weighted average (using the before-rates volumes as weights) of the single-piece and workshare elasticity sums. The forgoing discussion is presented numerically in Table 5 below and in LR-I-156.

Table 5
Estimated Price Elasticities for the First-Class Letter Subclass

Category	Before-Rates Volume	Volume Weights	Own-Price Elasticity	Discount Elasticity	Sum of Own and Discount Elasticities
single-piece	53,214	0.5307	-0.261716	-0.138753	-0.400470
workshare	47,048	0.4693	-0.250972	0.216425	-0.034547
total letters	100,262	1.0000			**-0.228760**

Note that the subclass own-price elasticity is somewhat less than either the single-piece or workshare own-price elasticity. This result occurs because a one percent increase in subclass price leads to an increase in the workshare discount. The increase in the discount causes some single-piece mailers to begin worksharing. The price increases cause a smaller decline in subclass volume (smaller elasticity) because mail that shifts from single-piece to workshare remains in the subclass.

Table 6 presents the own- and cross-price elasticities of the 22 postal products examined in this testimony.

Table 6
Estimated Price Elasticities

Mail Product	Own-Price Elasticity	Cross-Price Elasticity	Cross-Price Elasticity
First-Class Letters	-0.228760	0.007005 (First-Class cards)	0.020942 (Standard A Regular)
First-Class Cards	-0.851802	0.209626 (First-Class letters)	
Priority Mail	-0.819484	0.055460 (parcel post)	
Express Mail	-1.565418	0.542110 (Priority Mail)	
Periodicals In-County	-0.141875		
Periodicals Nonprofit	-0.235956		
Periodicals Classroom	-0.406900		
Periodicals Regular Mail	-0.147670		
Standard A Regular Mail	-0.570396	0.069874 (First-Class letters)	
Standard A ECR	-0.808099		
Standard A Nonprofit Mail	-0.161516		
Standard A ECR Nonprofit	-0.161516		
Standard B Parcel Post	-1.229644	0.147954 (Priority Mail)	
Standard B Bound Printed	-0.391912		
Standard B Special Rate	-0.295929		
Standard B Library Rate	-0.654130		
Registry	-0.245566		
Insurance	-0.178710		
Certified	-0.289232		
C.O.D.	-0.192231		
Return Receipts	-0.450967		
Money Orders	-0.429894		

C. Costs

1. Marginal Cost

The Ramsey pricing formula requires product marginal costs. Ramsey prices are calculated for a 2001 Test Year and use forecasts of Test Year costs, including the 2.5 percent contingency. The marginal cost of a product, as it is strictly defined in economics, is the additional cost associated with a one unit increase in output of that product. The Postal Service costing methodology provides a cost estimate that is similar to marginal cost, known as volume variable cost. Volume variable cost is defined as those costs of a mail product that vary with volume. Product marginal costs for 2001 are taken as equal to per piece volume variable costs, calculated by dividing Test Year before-rates volume variable cost by Test Year before-rates volume, as presented in Mr. Kashani's testimony (USPS-T-14). It is assumed that in the range of volumes being considered, volume variable cost per piece, and therefore marginal cost, is constant. In fact, Postal Service analysis shows that the marginal costs at the after-rates volumes are slightly different. However, for simplicity and consistency, this testimony uses before-rates marginal costs throughout the analysis.

As noted in the previous section, the prices of First-Class letters and cards, and Standard A Regular and Nonprofit mail are measured including user costs. To be consistent with this price measure, the Ramsey pricing formula uses marginal costs including mailer user cost. The data in Table 7, however, include only Postal Service costs.

2. Incremental Cost

Another cost measure that should be considered in rate-making is incremental cost. The incremental cost of a product is the cost that the Postal Service would save if the product were eliminated entirely. In addition to covering the product's volume variable

costs, postal prices (Ramsey or otherwise) should generate sufficient revenues to cover the product's incremental cost. If not, the Postal Service and other mailers would be better off if the product were discontinued.

Accordingly, Ramsey prices are calculated as a mark-up over marginal cost. The total revenues from the product at the Ramsey prices are then compared to the product's incremental cost. If these total revenues are less than incremental cost, the price must be marked up above the Ramsey price until revenues cover incremental costs. Express Mail has a Ramsey price that generates revenues below incremental costs. Consequently, the price of Express Mail is constrained above the Ramsey prices so that revenues cover incremental costs.

Table 7 shows 2001 Test Year forecasted before-rates volume, volume variable costs, volume variable costs per piece (taken to be marginal cost excluding user costs), and incremental costs for the 22 products included in the Ramsey price model. Costs include the two and one-half percent contingency. Incremental costs are presented in Witness Kay's testimony (USPS-T-23).

Table 7
Cost Data for 2001 Test Year
(All data in millions except marginal cost)

Mail Product	Before-Rates Volume	Volume Variable Cost	Marginal Cost	Incremental Cost
First-Class Letters	100,261.726	$18,565.943	$0.1852	$19,977.933
First-Class Cards	5,584.931	$731.116	$0.1309	$746.845
Priority Mail	1,331.105	$3,263.396	$2.4516	$3,608.816
Express Mail	71.641	$476.631	$6.6530	$718.888
Periodicals In-County	872.194	$82.227	$0.0943	$82.923
Periodicals Nonprofit	2,095.809	$370.280	$0.1767	$372.301
Periodicals Classroom	56.415	$14.284	$0.2532	$14.321
Periodicals Regular Mail	7,410.104	$2,031.214	$0.2741	$2,050.321
Standard A Regular Mail	42.783.773	$7,125.095	$0.1665	$7,242.821
Standard A ECR	33,630.517	$2,527.785	$0.0752	$2,675.104
Standard A Nonprofit Mail	11,510.795	$1,326.100	$0.1152	$1,339.791
Standard A ECR Nonprofit	2,907.206	$212.388	$0.0731	$212.580
Standard B Parcel Post	378.447	$1,078.202	$2.8490	$1,087.513
Standard B Bound Printed	541.976	$493.424	$0.9104	$496.691
Standard B Special Rate	208.687	$304.846	$1.4608	$305.677
Standard B Library Rate	29.009	$48.295	$1.6648	$48.355
Registry	11.563	$89.272	$7.7205	$89.381
Insurance	45.610	$78.162	$1.7137	$78.306
Certified	295.742	$494.945	$1.6736	$588.165
C.O.D.	3.576	$15.105	$4.2240	$15.129
Return Receipts	252.559	$329.509	$1.3047	$329.509
Money Orders	234.993	$159.605	$0.6792	$222.366

3. Productive Efficiency and Ramsey Pricing

In its R97-1 Opinion, the Postal Rate Commission (PRC) cast doubt on the standard application of Ramsey pricing to postal products, in which the socially optimal price is a demand-based mark-up over measured postal marginal cost. Instead, the PRC argued that Ramsey prices should be based on mark-ups over the marginal cost of a so-called "efficient" producer, while still generating enough revenue to satisfy the break-even constraint of the presumed (by the PRC) inefficient Postal Service. Specifically, the PRC argues that the cost basis for rate setting is equal to "a weighted sum of the inefficient marginal cost and efficient marginal cost of producing the good." [PRC Opinion and Recommended Decision, 4038]

That analysis is in direct conflict with the testimony of Postal Service witness William Baumol (USPS-T-3) in the R87-1 rate case. Baumol dedicates a significant portion of his testimony to the issue of what cost measure should be used in rate-setting. He testified at page 11, lines 17-19, that "rates should be based upon marginal costs and demand conditions." As to what is the proper measure of marginal cost, Baumol states at page 12, lines 7-10, "the answer is that they should be the actual marginal costs. [his emphasis] When output of a service is increased (or decreased), there is only one amount of cost actually added (or saved), not two or three."

Baumol also discusses the issue of cost efficiency and its relevance, if any, to postal rate-making. At page 12, lines 10-12 he states that, "[t]he actual marginal costs are normally closest to what economists call short run marginal costs (SRMC)." Later, at page 42, lines 17-23, he elaborates regarding the definition of short run marginal cost. "Short run marginal cost (SRMC) is defined by economists as the actual additional cost that will be incurred by the enterprise as the result of a unit increase in volume of activity, given the imperfections in choice of the enterprise (plant, equipment, etc.) that are already in place

and any other commitments (e.g., agreements with labor unions) that temporarily circumscribe management's freedom of decision."

In sum then, Baumol makes two key points. First, rates should be based on actual marginal costs -- not some hypothetical costs that could exist under different conditions. Second, actual marginal costs may reflect productive inefficiencies or, in his words, "imperfections in the choice of the enterprise," that exist at the present time. Or put more simply, rates in a future Test Year should be based on marginal costs expected in that future Test Year, whatever and however those marginal costs are incurred.

The foregoing discussion is not meant to imply that productive efficiency is an unimportant issue. In fact, it is very important. If the Postal Service can find ways to improve its efficiency and lower its costs, postal rates can be reduced resulting in gains to mailers. But, ultimately, the impact on mailers is measured in terms of postal prices. The gains to mailers that result from moving from one set of break-even rates to another set of break-even rates are a function of the change in postal prices and postal volumes, and the calculations hold true whether the postal costs are "efficient" or "inefficient."

D. Volume Forecasts

Forecasted volumes are needed in the calculation of the Ramsey prices, as the Ramsey price of a mail subclass depends on its volume and on the volumes of any other subclass with which it has a cross-price elasticity. Forecasted volumes are also needed to calculate total revenues and total costs and determine if the break-even requirement is satisfied.

1. Volume Forecast Methodology

The starting point of the forecasted Test Year volumes at the Ramsey prices are the forecasted Test Year volumes at current postal prices, known as the before-rates volume

forecast. The before-rates forecast of mail volumes is presented in the testimony of Dr. Tolley (USPS-T-6), and include the before-rates forecasts of Priority and Express Mail also presented in the testimony of Dr. Musgrave (USPS-T-8). Both Dr. Tolley and Dr. Musgrave use the same forecasting approach, which involves projecting the Test Year volume from the volume in a Base Year through the use of a series of projection factor multipliers. Each projection factor considers the impact of a particular variable (e.g., price, income, or population) on volume from the Base Year to the Test Year.

The same basic approach is used to project volumes in the Test Year at the Ramsey prices. The Test Year Ramsey volume is projected from the Test Year before-rates volume through the use of projection factors. Because the Test Year for the Ramsey volumes is the same as the Test Year for the before-rates volumes, the only variable which differs between the two forecasts is the postal price. Therefore, the Ramsey Test Year volume of a mail product is obtained by multiplying the before-rates Test Year volume of the product by a projection factor which accounts for the change in the price of the mail product. If the volume of the product depends on the price of other postal products, a cross-price projection factor multiplier is also included in the volume forecast at the Ramsey prices.

The price projection factor multiplier is equal to the ratio of the Ramsey price to the before-rates price raised to the estimated price elasticity. In a simplified form and without cross-price elasticities, the Ramsey volume forecast can be presented as:

$$\text{Ramsey Volume} = \text{Before-Rates Volume} \bullet (P_R/P_{br})^E$$

where P_R is the Ramsey price of the subclass, P_{br} is the before-rates price of the subclass, and E is the estimated own-price elasticity of the subclass. $(P_R/P_{br})^E$ is known as the rate projection factor multiplier. Prices include user costs, where appropriate.

2. Elasticities Used in the Test Year Volume Forecasts

The simplified form of the rate projection factor multiplier differs from the rate projection factor multipliers used in the forecasts of Drs. Tolley and Musgrave. In particular, the forecasts of Drs. Tolley and Musgrave are made on a quarterly basis, using the current and lagged price elasticities and including terms that convert the annual Base Year volume into a quarterly volume. Moreover, forecasted quarterly volumes are converted into an annual volume for the Test Year, which does not begin at the beginning of a postal quarter. This exact approach differs from the approach described above in which a single rate projection multiplier is used to convert the before-rates Test Year volume into a Ramsey Test Year volume.

The full volume forecasting approach uses four rate projection factor multipliers, one for each of the current and lagged estimated elasticities. Current and lagged elasticities are included in the volume forecasts because the econometric evidence shows that mailers' response to a change in postal rates does not all occur in the quarter in which rates were changed. The lagged elasticities reflect the period of adjustment by mailers to the new rates. In the long-run, the volume response is given by the sum of the current and lagged price elasticities. For the present rate case, the new rates are assumed to be put in effect on the first day of the Test Year. The volume impact in the first quarter following the rate increase will be smaller than the impact in the fourth quarter following the rate increase, owing to the lagged response of mailers to changes in rates as measured by the current and lagged price elasticities. Consequently, the volume response in the Test Year is not the long-run response, and using the long-run elasticity to forecast the Ramsey Test Year volumes would overstate the volume impact of the change from the before-rates price to the Ramsey prices.

One solution to this problem would be to use the full volume forecasting approach including current and lagged elasticities and seasonal coefficients to make the Ramsey volume forecasts on a quarterly basis instead of making Test Year forecasts using a single elasticity. However, the Ramsey price computer calculations require an iterative approach, necessitating frequent calculations of volume, revenues, and costs, and use of the full forecast methodology employed by Drs. Tolley and Musgrave was considered impractical. Instead, effective Test Year elasticities are used where the effective Test Year elasticity is a weighted average of the estimated current and lagged elasticities. For example, in the first quarter of the Test Year, only the current elasticity affects mail volume. In the second quarter, the current and first lagged elasticity affect mail volume, in the third quarter the current and first two lagged elasticities affect mail volume, and in the fourth quarter of the Test Year, the current and all three lagged elasticities affect mail volume. The effective elasticity for the Test Year, bearing in mind that the first three postal quarters are 12 weeks long while the fourth postal quarter is 16 weeks long is calculated as:

(12/52)•(current elasticity) +
(12/52)•(current elasticity + lag 1 elasticity) +
(12/52)•(current elasticity + lag 1 elasticity + lag 2 elasticity) +
(16/52)•(current elasticity + lag 1 elasticity + lag 2 elasticity + lag 3 elasticity)

As an example, the effective Test Year own-price elasticity of Standard A Enhanced Carrier Route mail is calculated below. LR-I-156 presents the entire set of effective Test Year price elasticities used in making the Ramsey volume forecasts.

Effective Test Year elasticity for Standard A ECR Mail = -0.499847 =

(12/52)•(-0.217425) +

(12/52)•(-0.217425 - 0.146204) +

(12/52)•(-0.217425 - 0.146204 - 0.143854) +

(16/52)•(-0.217425 - 0.146204 - 0.143854 - 0.300616)

Thus, the effective own-price elasticity for Standard A ECR Mail in the Test Year is about -0.500. This elasticity is used to make the Test Year volume forecast, which assumes that the new rates take affect the first day of the Test Year.

E. Ramsey Net Revenue Requirement

1. Defining the Net Revenue Requirement

The Ramsey prices must generate projected Test Year revenues equal to projected Test Year costs. Test Year revenues and costs include revenues and costs generated from the products included in the Ramsey pricing model as well as revenues and costs generated from other Postal Service operations.

Some revenues and costs are unaffected by the Ramsey prices presented in this testimony. Product specific fixed costs and other non-volume variable costs are not affected by the Ramsey prices or volumes. In addition, the revenues and costs of products not included in the Ramsey pricing model, as well as revenues from investment income and a small congressional appropriation for such things as free-for-the-blind mail are not affected by the Ramsey prices. The Ramsey net revenue requirement is defined as the excess of total revenues over total volume variable costs of the products included in the Ramsey pricing model that is necessary to yield total Postal Service revenues equal to total Postal Service costs in the Test Year.

2. Calculating Net Revenue Requirement

The Ramsey prices of the mail products considered in this testimony are designed to generate the same level of net revenues as generated by these products at the Postal Service's proposed after-rates prices. Net revenue at the proposed after-rates prices is the sum of the net revenues of the individual products. For each mail product, after-rates net revenue is equal to after-rates revenue minus after-rates cost. After-rates revenue is,

in turn, equal to the after-rates price multiplied by the after-rates volume. That is, the after-rates price (measured as a fixed-weight index price) is taken to be a measure of average revenue per piece. Similarly, the after-rates cost of each mail product is equal to volume variable cost per piece (or marginal cost) multiplied by the after-rates volume.

Formally, the Ramsey and the non-Ramsey prices presented in this testimony must generate net revenue obtained from the following calculation.

Net Revenue Requirement= $\sum[(P_{AR} \bullet V_{AR}) - (MC \bullet V_{AR})]$

where the subscript AR indicates after-rates values of the variables at the Postal Service proposed prices.

Table 8 presents the calculation of the after-rates net revenue requirement used in this testimony. Note that this differs somewhat from the calculation of after-rates net revenues presented by the Postal Service in this case because Table 8 is based on the before-rates marginal costs.

Table 8
After-Rates GFY 2001 Net Revenues at Proposed USPS Rates

Postal Product	Marginal Cost	After-Rates Price	After-Rates Volume	Net Revenue
First-Class Letters	$0.1852	$0.3560	99,857.394	$17,055.3
First-Class Cards	$0.1309	$0.1939	5,440.951	$342.9
Priority Mail	$2.4516	$4.4358	1,226.160	$2,432.9
Express Mail	$6.6530	$14.5760	72.301	$572.8
Periodicals In-County	$0.0943	$0.0928	862.061	($1.3)
Periodicals Nonprofit	$0.1767	$0.1804	2,052.208	$7.7
Periodicals Classroom	$0.2532	$0.2610	55.089	$0.4
Periodicals Regular	$0.2741	$0.2735	7,351.808	($4.4)
Standard A Regular	$0.1665	$0.2209	40,998.656	$2,229.8
Standard A ECR	$0.0752	$0.1568	32,828.211	$2,681.4
Standard A Nonprofit	$0.1152	$0.1302	11,425.579	$171.6
Standard A Nonprofit ECR	$0.0731	$0.0881	2,851.875	$43.0
Standard B Parcel Post	$2.8490	$3.2290	374.096	$142.2
Standard B Bound Printed	$0.9104	$1.0713	524.743	$84.4
Standard B Special Rate	$1.4608	$1.6443	205.789	$37.8
Standard B Library Rate	$1.6648	$1.7918	28.432	$3.6
Registry	$7.7205	$9.4645	10.966	$19.1
Insurance	$1.7137	$2.2903	44.680	$25.8
Certified	$1.6736	$2.1463	274.934	$130.0
C.O.D.	$4.2240	$5.6458	3.544	$5.0
Return Receipts	$1.3047	$1.5118	220.088	$45.6
Money Orders	$0.6792	$0.9096	226.435	$52.2
Total				$26,077.7

F. Price Constraints

1. Incremental Cost Coverage

In addition to covering the product's volume variable costs, postal prices should generate sufficient revenues to cover the product's incremental cost. If not, the Postal Service and other mailers would be better off if the product were discontinued. The Ramsey price of Express Mail and of Registry mail, while above the product's marginal cost, are not sufficiently above marginal cost to also cover the product's incremental costs. Therefore, the prices presented for these products are not the Ramsey prices but a higher price that provides sufficient revenue above volume variable cost to also cover incremental cost.

2. Preferred Subclasses

As a requirement of Revenue Forgone Reform Act, the mark-up for preferred subclasses of mail is set at one-half the mark-up of the corresponding regular subclass. The six preferred subclasses are Periodicals In-county, Nonprofit, and Classroom mail, Standard A Nonprofit and Nonprofit Enhanced Carrier Route, and Standard B Library rate. The three preferred subclasses of Periodicals mail are assigned a mark-up equal to one-half the mark-up on Periodicals Regular mail; Standard A Nonprofit and Nonprofit Enhanced Carrier Route are assigned mark-ups equal to one-half the mark-ups for Standard A Regular and Enhanced Carrier Route mail, respectively; and Library Rate is assigned a mark-up equal to one-half the mark-up on special rate.

3. Periodical Regular Price

The mark-up on Periodicals Regular mail is constrained to 100 percent, equal to a cost coverage of 200 percent. In the absence of this constraint, the Ramsey pricing model would yield a Periodicals mark-up of 208.5 percent and a cost coverage of 308.5 percent. The very high mark-up is a direct result of the very low own-price elasticity of Periodicals

Mail. At the unconstrained Ramsey price, projected net revenues from Periodicals Mail (including the preferred subclasses that have mark-ups tied to the Regular mark-up) would be $4.0 billion, allowing for a substantial reduction in the price of every other mail product. It seems that this kind of result would provide little guidance to rate-makers.

Chapter 4: Non-Ramsey After-Rates Prices for R2000-1

A. Why Non-Ramsey Prices are Needed

The benefits from Ramsey pricing can be measured in comparison to some other rate schedule that also satisfies the Postal Service's break-even requirement. In this testimony, the Ramsey prices are compared to an illustrative break-even rate schedule based on the Postal Rate Commission's (PRC) recommended mark-ups in R97-1. PRC mark-ups are measured as a mark-up over attributable cost, which differs from the Postal Service's measure of volume variable costs. Nonetheless, the Postal Service provides calculations of attributable costs using the PRC costing methodology. Therefore, the PRC recommended R97-1 mark-ups can be applied to projected GFY 2001 attributable costs. The R97-1 recommended mark-ups are adjusted slightly downward in a way that maintains the relative mark-ups (the Mark-up Index) while satisfying the net revenue requirement used in this testimony. Note that net revenues are calculated as the difference between revenues and volume variable costs (not attributable costs) to be consistent with the net revenue calculation of the Ramsey prices.

B. Non-Ramsey Rates Based on the Commission's R97-1 Rates

1. R97-1 Mark-Ups

Table 9 below presents the R97-1 recommended mark-ups, defined as the excess of product revenue over product attributable cost, for the products included in the Ramsey price model, obtained from Appendix G, Schedule 3 of the Postal Rate Commission's R97-1 Opinion and Recommended Decision and Appendix J. Table 9 shows the system-wide mark-up, equal to total revenues from mail and special services less total attributable costs, divided by total attributable costs. Table 9 also shows the Mark-up Index of each mail subclass, calculated as the ratio of subclass mark-up to system wide mark-up. For example, the R97-1 recommended mark-up of First-Class letters is 72.4, meaning that

Table 9
R97-1 Mark-Ups of Mail Products Included in the Ramsey Pricing Model

Mail Product	R97-1 Recommended Mark-up	R97-1 Recommended Mark-Up Index
First-Class Letters	72.4	1.308
First-Class Cards	50.5	0.913
Priority Mail	66.1	1.195
Express Mail	13.6	0.245
Periodicals In-County	0.5	0.010
Periodicals Nonprofit	0.7	0.012
Periodicals Classroom	-16.3	-0.294
Periodicals Regular Rate	1.0	0.017
Standard A Regular	34.6	0.626
Standard A ECR	103.0	1.863
Standard A Nonprofit	13.7	0.248
Standard A Nonprofit ECR	43.0	0.778
Standard B Parcel Post	8.0	0.144
Standard B Bound Printed Matter	35.6	0.643
Standard B Special Rate	5.6	0.101
Standard B Library Rate	-17.9	-0.324
Registry	23.4	0.423
Insurance	44.7	0.808
Certified	12.5	0.226
COD	0.4	0.007
Return Receipts	43.5	0.787
Money Orders	46.9	0.848
All Mail and Special Services	55.3	1.000

at recommend rates, projected revenues from First-Class letters are 72.4 percent greater than projected attributable costs. The system wide mark-up is equal to 55.3. Therefore, the relative mark-up of First-Class letters is equal to 72.4/55.3 or 1.308. Note that the R97-1 decision did not present a mark-up for return receipts. The mark-up of 43.5 shown in Table 9 is the R97-1 average mark-up for the special services

2. R97-1 Mark-ups Applied to Test Year Attributable Costs

The R97-1 mark-ups are applied to 2001 Test Year attributable costs as calculated by the Postal Service using the PRC costing methodology. In doing this, the recommended mark-ups of the preferred subclasses are set equal to exactly one-half the recommended mark-up of the corresponding regular subclass. Net revenues at the resulting prices and volumes are found to be somewhat more than net revenues generated at the Ramsey prices presented in this testimony. Therefore, the R97-1 mark-ups are adjusted upward/downward until the Ramsey net revenue requirement is satisfied. The mark-up adjustment is done to maintain the R97-1 Mark-up Index, meaning that relative mark-ups are the same as in R97-1. For example, the R97-1 recommended mark-up for First-Class letters was 72.4 and for First-Class cards was 50.5. Thus, the mark-up on letters was about 1.43 times the mark-up on cards. The GFY 2001 mark-ups for these two subclasses (shown presently in Table 10) are 69.6 and 48.5, respectively, maintaining the same relative mark-ups as was recommended by the PRC in R97-1.

3. Presentation of Non-Ramsey Test Year Mark-ups

Table 10 presents break-even after-rates prices based on the PRC recommended mark-ups in R97-1. These prices will be referred to as R97-1 Index prices. Table 10 also shows the mark-ups (over attributable cost) in R97-1 and R2000-1. The prices and mark-ups are not a projection or suggestion of what prices the PRC will recommend in the current case.

Table 10
R2000-1 After-Rates Prices and Mark-Ups Based on the R971- Mark-ups

Mail Product	R2000-1 Price	R2000-1 Mark-up	R97-1 Mark-up
First-Class Letters	$0.3442	69.6	72.4
First-Class Cards	$0.2111	48.5	50.5
Priority Mail	$4.4382	63.5	66.1
Express Mail	$11.2503	13.1	13.6
Periodicals In-County	$0.0979	0.5	0.5
Periodicals Nonprofit	$0.1881	0.5	0.7
Periodicals Classroom	$0.2692	0.5	-16.3
Periodicals Regular Rate	$0.2927	1.0	1.0
Standard A Regular	$0.2407	33.3	34.6
Standard A ECR	$0.1594	99.0	103.0
Standard A Nonprofit	$0.1450	16.6	13.7
Standard A Nonprofit ECR	$0.1163	49.5	43.0
Standard B Parcel Post	$3.1547	7.7	8.0
Standard B Bound Printed	$1.2271	34.2	35.6
Standard B Special Rate	$1.5895	5.4	5.6
Standard B Library Rate	$1.7593	2.7	-17.9
Registry	$9.1146	22.5	23.4
Insurance	$2.4969	43.0	44.7
Certified	$2.0606	12.0	12.5
COD	$4.7301	0.4	0.4
Return Receipts	$1.8502	41.8	43.5
Money Orders	$1.0436	45.1	46.9

Chapter 5: Ramsey Prices for R2000-1

A. Aggregate Results

1. Description of Table

Table 11 presents a comparison of the Ramsey and the R97-1 Index rate schedules. The first section of Table 11 presents three columns of general information about each of the 22 subclasses and special services that comprise the model: name, R2000-1 estimated elasticity, and marginal costs, equal to before-rates volume variable cost per piece. The 22 mail products are grouped by class: First-Class letters and cards, the two expedited mail subclasses, Priority Mail and Express Mail, the four Periodicals subclasses, the four subclasses of Standard A mail, the four subclasses of Standard B mail, and six special services.

The middle section of Table 11 presents the R97-1 Index after-rates price based on the mark-ups presented in Table 10. The next columns show the mark-up of price over marginal cost, the after-rates volume (in millions of pieces), product revenues, product volume variable costs and product net revenues. For example, First-Class letters has a R97-1 Index after-rates price of $0.3442, measured as a fixed weight index price, yielding a mark-up of 85.9 percent over Test Year volume variable cost per piece of $0.1852. Forecasted after-rates volume is 100,666 million pieces, generating revenues of $34,652 million, volume variable costs of $18,641 million, and net revenues of $16,011 million.

The bottom row of the middle section of Table 11 presents total volumes, revenues, volume variable costs, and net revenues for the R97-1 Index rate schedule. Total volume (not including the special services) is 202,749 million pieces. Total revenue from the 22 mail products is $64,666, with total volume variable costs of $38,588 million, yielding net revenues of 26,078 million, thereby satisfying the break-even requirement for these mail

TABLE 11
Comparison of R97-1 Index and Ramsey Prices

Mail Category	Own-Price	Marginal Cost	R2000-1 Prices Based on PRC R97-1 Mark-up Index						R2000-1 Ramsey Prices					
			Price (FWI)	Mark-Up	Volume (millions)	Revenue ($millions)	Cost ($millions)	Net Revenue	Price (FWI)	Mark-Up	Volume (millions)	Revenue ($millions)	Cost ($millions)	Net Revenue
First-Class LFIPPs	-0.229	0.1852	0.3442	85.9%	100,665.8	34,652.0	18,640.8	16,011.2	0.3704	100.0%	98,818.0	36,602.8	18,298.6	18,304.2
First-Class Cards	-0.852	0.1309	0.2111	61.3%	4,974.1	1,050.3	651.2	399.1	0.1794	37.1%	5,760.5	1,033.6	754.1	279.5
Priority Mail	-0.819	2.4516	4.4382	81.0%	1,186.9	5,267.8	2,909.9	2,357.9	3.0037	22.5%	1,636.7	4,916.2	4,012.7	903.5
Express Mail	-1.565	6.6530	11.2503	69.1%	106.8	1,201.4	710.5	490.9	10.0346	50.8%	110.5	1,108.4	734.9	373.5
Periodicals In-County	-0.142	0.0943	0.0979	3.9%	855.5	83.8	80.7	3.1	0.1414	50.0%	812.0	114.8	76.6	38.3
Periodicals Nonprofit	-0.236	0.1767	0.1881	6.5%	2,021.4	380.3	357.1	23.1	0.2650	50.0%	1,864.4	494.1	329.4	164.7
Periodicals Classroom	-0.407	0.2532	0.2692	6.3%	52.9	14.2	13.4	0.8	0.3798	50.0%	45.9	17.5	11.6	5.8
Periodicals Regular	-0.148	0.2741	0.2927	6.8%	7,200.2	2,107.3	1,973.7	133.6	0.5482	100.0%	6,562.9	3,597.9	1,799.0	1,799.0
Standard A Regular	-0.570	0.1665	0.2407	44.5%	38,737.2	9,323.7	6,451.2	2,872.6	0.2251	35.2%	40,423.8	9,099.9	6,732.1	2,367.9
Standard A ECR	-0.808	0.0752	0.1594	112.1%	31,907.6	5,087.3	2,398.3	2,689.0	0.0864	15.0%	52,337.1	4,523.2	3,933.8	589.4
Standard A Nonprofit	-0.162	0.1152	0.1450	25.9%	11,216.2	1,626.3	1,292.2	334.1	0.1355	17.6%	11,337.7	1,535.9	1,306.2	229.7
Standard A Nonprofit ECR	-0.162	0.0731	0.1163	59.2%	2,715.8	315.9	198.4	117.5	0.0785	7.5%	2,893.7	227.2	211.4	15.8
Standard B Parcel Post	-1.230	2.8490	3.1547	10.7%	379.0	1,195.6	1,079.8	115.8	3.2448	13.9%	345.6	1,121.3	984.5	136.8
Standard B BPM	-0.392	0.9104	1.2271	34.8%	482.1	591.5	438.9	152.7	1.2449	36.7%	479.4	596.8	436.4	160.3
Standard B Special Rate	-0.296	1.4608	1.5895	8.8%	207.9	330.4	303.7	26.8	2.2677	55.2%	187.1	424.3	273.3	151.0
Standard B Library	-0.654	1.6648	1.7593	5.7%	28.5	50.2	47.5	2.7	2.1246	27.6%	25.2	53.6	42.0	11.6
Registry	-0.246	7.7205	9.1146	18.1%	11.1	100.9	85.5	15.4	13.5165	75.1%	10.0	135.8	77.6	58.2
Insurance	-0.179	1.7137	2.4969	45.7%	43.3	108.2	74.3	33.9	4.1719	143.4%	39.5	165.0	67.8	97.2
Certified	-0.289	1.6736	2.0606	23.1%	266.6	549.4	446.2	103.2	2.6317	57.3%	248.4	653.7	415.7	238.0
COD	-0.192	4.2240	4.7301	12.0%	3.6	17.2	15.4	1.8	9.3407	121.1%	3.2	29.8	13.5	16.3
Return Receipts	-0.451	1.3047	1.8502	41.8%	212.1	392.5	276.8	115.7	1.7021	30.5%	220.3	374.9	287.4	87.5
Money Orders	-0.430	0.6792	1.0436	53.6%	210.6	219.8	143.0	76.7	0.8995	32.4%	224.5	201.9	152.5	49.5
TOTALS				**67.6%**	**202,749.0**	**64,665.9**	**38,588.1**	**26,077.7**		**63.7%**	**223,650.6**	**67,028.6**	**40,950.9**	**26,077.7**

Estimated Gain to Mailers from Ramsey Pricing = $1,272.0 Million

products. The overall mark-up for the R97-1 Index prices, equal to total revenues less total volume variable costs, divided by total volume variable costs, is 67.6 percent.

The third section of Table 11 presents Ramsey price information following the same organization as the R97-1 Index section. The Ramsey price, mark-up, volume, revenue, and volume variable cost of each product are given. The bottom of the section shows total forecasted Test Year mail volume under Ramsey pricing of 223,651 million pieces or 10.3 percent more than the R97-1 Index volume. Total revenue under Ramsey pricing is equal to $67,029 million and total volume variable cost is 40,951 million. Net revenues under Ramsey pricing are $26,078 million which satisfies the Ramsey net revenue requirement. The average mark-up under Ramsey pricing is 63.7 percent.

The increase in total mail volume and the decrease in average mark-up are a reflection of the benefit to mailers from Ramsey pricing. A more formal presentation of this benefit is the increase in consumer surplus under Ramsey pricing as opposed to the R97-1 Index rate schedule. Table 11 shows that the increase in consumer surplus from Ramsey pricing is $1,272 million in the Test Year. Chapter 6 discusses the increase in consumer surplus from Ramsey pricing in more detail.

2. Summary of Key Differences in Prices

In general, products that have a relatively low own-price elasticity have a higher Ramsey price than an R97-1 Index price. This is the case for First-Class letters, Periodicals Regular mail, and Standard B Special Rate mail. Conversely, products that have a relatively high own-price elasticity have lower Ramsey prices, e.g., First-Class cards, Priority Mail, Express Mail, and Standard A ECR Mail.

3. Comparison of Mark-Ups and Mark-Up Indices

Table 12 compares the mark-up of each mail product under the R97-1 Index and Ramsey rate schedules. The mark-up is defined as the percentage by which product

TABLE 12
Mark-Up Comparison for GFY 2001 After-Rates Prices

Mail Product	R97-1 Index Mark-up	R97-1 Index Mark-up Index	Ramsey Mark-up	Ramsey Mark-up Index
First-Class Letters	85.9	1.27	100.0	1.57
First-Class Cards	61.3	0.91	37.1	0.58
Priority Mail	81.0	1.20	22.5	0.35
Express Mail	69.1	1.02	50.8	0.80
Periodicals In-County	3.9	0.06	50.0	0.79
Periodicals Nonprofit	6.5	0.10	50.0	0.79
Periodicals Classroom	6.3	0.09	50.0	0.79
Periodicals Regular	6.8	0.10	100.0	1.57
Standard Regular	44.5	0.66	35.2	0.55
Standard ECR	112.1	1.66	15.0	0.24
Standard Nonprofit	25.9	0.38	17.6	0.28
Standard NP ECR	59.2	0.88	7.5	0.12
Parcel Post	10.7	0.16	13.9	0.22
Bound Printed Matter	34.8	0.52	36.7	0.58
Special Rate	8.8	0.13	55.2	0.87
Library Rate	5.7	0.08	27.6	0.43
Registry	18.1	0.27	75.1	1.18
Insurance	45.7	0.68	143.4	2.25
Certified	23.1	0.34	57.3	0.90
COD	12.0	0.18	121.1	1.90
Return Receipts	41.8	0.62	30.5	0.48
Money Orders	53.6	0.79	32.4	0.51
Overall	67.6	1.00	63.7	1.00

revenues exceed product volume variable cost. For the R97-1 Index prices, therefore, the mark-up presented in Table 12 is different from the mark-up presented in Table 10.

Table 12 also shows the mark-up index under each rate schedule. The mark-up index is equal to the product mark-up divided by the overall mark-up of the 22 mail products considered in this testimony. For example, the R97-1 Index mark-up of First-Class letters is 85.9 percent, meaning that letter revenues exceed volume variable costs by 85.9 percent. The system wide mark-up under R97-1 Index prices is 67.6 percent. Therefore, First-Class letters has a mark-up index of 85.9/67.6 or 1.27, meaning that its mark-up is 1.27 times the system-wide mark-up.

The Ramsey mark-up of First-Class letters is 100.0 percent as compared to a system-wide mark-up under Ramsey pricing of 63.7 percent. Therefore, the mark-up index for letters under Ramsey pricing is 1.57 (100.0/63.7). Similar calculations yield the mark-up indexes of all the mail products under each pricing schedule.

B. Individual Subclass Results

1. First-Class Letters

a. Subclass Results

The Ramsey price of First-Class letters is $0.3704, 2.62 cents (or 7.6 percent) more than the R97-1 Index price of $0.3442. Recall that this price is a fixed-weight index price and does not refer to the price of the basic one ounce letter, currently priced at 33 cents. The higher Ramsey price is a direct result of the relatively low own-price elasticity of First-Class letters and the fact that letters are a substitute for two other postal products, First-Class cards and Standard A Regular mail. Thus, raising the price of letters is a relatively efficient way to raise net revenue, first because the higher price causes a small decline in volume due to the low own-price elasticity and because the higher letters price causes

increases in net revenues earned from an increase in the volume of its two substitute postal products.

The Ramsey volume of First-Class letters is 98,818 million pieces, or 1.8 percent less than the R97-1 Index volume of 100,666 million pieces. Total net revenue from First-Class letters under Ramsey pricing is $18,304 million as compared to $16,011 million under R97-1 Index rates.

b. Ramsey Pricing and Workshare Discounts

My R97-1 testimony included a chapter on the economically efficient discount for workshared letters. The chapter explained the theoretical arguments in favor of applying a Ramsey analysis to workshare discounts and also included illustrative estimates of the efficient discounts based on category cost and demand elasticity information. More recent work by Robert Mitchell, "Postal Worksharing, Technical Efficiency, and Pareto Optimality," also addressed this issue, using different cost assumptions and a somewhat different approach than was presented in my testimony.

While there is growing consensus regarding the relevant conceptual issues, exact calculation of economically efficient workshare discounts is complicated by limitations in the cost data and price elasticity estimates. For example, the cost savings for the Postal Service from worksharing are conceptually equal to the difference between the postal costs of single-piece and workshared letters. In practice, it is recognized that the measured cost difference probably overstates the Postal Service savings because of factors that create cost differences unrelated to worksharing. A second issue regards the demand elasticity estimation which includes an own-price and discount elasticity. This specification, which is well suited for volume forecasting, differs from the traditional own- and cross-price elasticity specification used in Ramsey pricing. While the discount elasticity can be converted to a cross-price elasticity (as Robert Mitchell and I have done independently),

the cross-price elasticity is found to depend on postal prices and is therefore not constant. This would require a complicated iterative approach to satisfy the Ramsey price formula.

Given these empirical complications, the present testimony does not provide estimates of the optimal workshare discount. Instead, a briefer discussion of the key conceptual issues is provided. The discussion addresses the following topics:

- When is workshare discount analysis appropriate
- The use of Ramsey Pricing
- The role of user costs
- The advantages and disadvantages of Efficient Component Pricing (ECP)
- Technical versus allocative efficiency
- The role of own- and cross-price (or discount) elasticities

Workshare discount analysis applies when there are activities that can be performed by either the Postal Service or the mailer (or an agent hired by the mailer). For example, the Postal Service can sort mail or the mailer can have the mail presorted. Put differently, either the Postal Service or the mailer can convert nonpresorted mail into presorted mail. Workshare discount analysis does not apply when considering two different types of mail, such as First-Class letters and Standard A mail. The Postal Service does not convert Standard A mail into First-Class mail or vice versa.

Ramsey pricing formulas can be theoretically designed to find category prices and category discounts that maximize the gains to mailers, subject to a net revenue requirement. One approach is to treat each mail category as a separate mail product with its own marginal cost and price elasticities. The Ramsey model would set prices for the two mail categories (along with all the other mail products) and the price difference could be viewed as the efficient workshare discount.

The difficulty with that approach is largely empirical. In the case of First-Class letters, single-piece and workshare mail have estimated own-price elasticities and discount elasticities, while the Ramsey pricing model uses own-price and cross-price elasticities. The own- and discount elasticity specification can be mathematically converted to own- and cross-price elasticities. However, the own-price and cross-price elasticities will depend on category prices and will therefore not be constant. This would require an iterative Ramsey pricing approach, adjusting the own-price and cross-price elasticities as price changes, until a consistent combination of Ramsey prices and elasticity estimates is found.

Another empirical difficulty is the role of user costs in the Ramsey pricing of workshare categories. User costs play a key role. Increases in the workshare discount lead to shifts of volume from single-piece mail because the new higher discount is greater than the workshare user costs. However, the gains to mailers (which is the foundation of the Ramsey analysis) must take account of the change in user costs. For example, suppose that the current price of single-piece letters is 33.0 cents, the current price of workshared letters is 27.0 cents, and the workshare discount is 6.0 cents. If the workshare price is lowered to 26.0 cents, thereby increasing the discount to 7.0 cents, some single-piece mailers will begin worksharing. In a simple approach in which worksharing is performed if the discount exceeds the user cost, the new workshare mailers will be those whose user cost is between 6.0 cents (the old discount) and 7.0 cents (the new discount).

The new workshare mailers experience a substantial reduction in their postage costs. Instead of sending 33.0 cent single-piece mail, they begin sending 26.0 cent workshare mail. But the gain to mailers is far less than the 7.0 cent postage savings because they incur a user cost of between 6.0 and 7.0 cents. If the average "shifting" mailer has a user cost of 6.5 cents, then the average savings of these mailers is only 0.5

cents, the difference between the single-piece price (33.0 cents) and the workshare price plus user cost (32.5 cents).

In my R97-1 testimony, the gains to mailers from changes in the workshare discount were divided into three categories. Gains to mailers from the reduction in the workshare letter rate, losses to mailers from the increase in the single-piece letter rate, and losses to mailers from the increase in user costs that follows from the greater level of worksharing in response to the increase in the workshare discount. Robert Mitchell used a similar approach in estimating the impact of changes in the discount on First-Class letter mailers.

Efficient Component Pricing (ECP) is designed to minimize the total cost of providing mail service by establishing the workshare discount that provides incentives for the party (the Postal Service or the mailer) with the lower cost of performing the workshare activity to perform that activity. For example, if worksharing saves the Postal Service 6.0 cents, then the ECP discount is 6.0 cents. In that case, any mailer who can perform the workshare activity for less than 6.0 cents (user cost less than the discount) will choose to workshare. If the mailer's user cost exceeds the discount, the mail will be sent as single-piece. This leads to an efficient allocation of worksharing since in both cases the party with the lower cost performs the activity.

A drawback of ECP is that while it establishes a cost minimizing discount, it provides no guidance regarding the proper prices of single-piece and workshared letters. This is important since both single-piece and workshared letters will have a price above marginal cost in order to raise net revenues. A cost minimizing ECP discount of six cents occurs with a 33 cent single-piece price and a 27 cent workshare price, or a single-piece price of 35 cents and a workshare price of 29 cents, or with any other price combination that yields a price difference of six cents. Yet, the overall impact on mailers is probably more

sensitive to category prices (and how category net revenues affect price of other products) than it is to the level of the workshare discount.

To illustrate this point, suppose that 49 percent of letter mail is always single-piece mail, another 49 percent is always workshare mail, and only 2 percent is shifting mail. The ECP rule would establish the cost minimizing price (discount) for the 2 percent of the mail that is actually affected by the workshare discount, while leaving unresolved the proper prices for the 98 percent of First-Class letter mail volume which, in this hypothetical, is unaffected by the workshare discount. The point is, one cannot independently set the price of single-piece mail, the price of workshare mail, and the workshare discount. Establishing any two of these prices automatically determines the third, and as a consequence some trade-offs between efficient category prices and the efficient discount must be recognized.

As such, a tradeoff can exist between technical efficiency (having the lowest cost agent perform the worksharing activity) and allocative efficiency (raising net revenues in a way that minimizes the burden on mailers). A complete Ramsey pricing model will take account of both these concerns since Ramsey prices are based on demand and cost considerations (including postal and mailer costs). In other words, Ramsey pricing dominates ECP in terms of overall efficiency.

From a practical perspective, however, ECP has the advantage of simplicity. Knowing the cost savings from worksharing (not a trivial task in itself) is sufficient to determine the technically efficient discount. The Ramsey pricing problem is more complex and does not appear to lend itself to any simple formulation.

Nonetheless, information about category own-price and cross (or discount) elasticities can provide guidance regarding possible efficient departures from ECP. Specifically:

- Efficient departures from ECP will occur if categories have different own-price elasticities of demand.

The Ramsey principle of establishing a higher mark-up on the less elastic product can lead to an efficient departure from ECP. If the nonworkshared category has a lower own-price elasticity than the workshared category, it should have a higher mark-up, which implies that the Ramsey discount will exceed the ECP discount. Under these circumstances, the technical losses from having some workshare activity performed by the higher cost party are less than the allocative gains from a more efficient method of raising net revenues.

- The greater is the cross-price or discount elasticity, the closer the Ramsey discount will be to the ECP discount.

Volume shifts that occur from having a Ramsey discount different from the ECP discount create technical losses. The size of the technical losses depends on how sensitive workshare volumes are to the discount. If volumes are very sensitive -- as would be the case where the cross-price or discount elasticity is relatively large -- small departures from the ECP discount will lead to relatively large shifts in volume and relatively large amounts of technical loss. Therefore, a large discount elasticity will move the discount closer to the ECP discount to reduce technical losses. On the other hand, if the discount elasticity between categories is relatively low, then the level of the discount has little effect on worksharing activity and little effect on technical efficiency. In that case, allocative efficiency (driven by own-price elasticity considerations) will dominate.

2. First-Class Cards

The Ramsey First-Class cards price is $0.1794, about three cents or 15 percent less than the R97-1 Index price of $0.2111. The lower Ramsey price is due to the relatively high own-price elasticity of First-Class cards. However, the Ramsey price of cards is positively affected by the presence of a cross-elasticity between cards and letters. An

increase in the price of cards leads to a small increase in the volume of letters. Therefore, some of the net revenue that "leaks" away from First-Class cards is recovered through greater First-Class letter volumes and net revenues. Note, for example, that the Ramsey mark-up on cards (37.1 percent) is greater than the Ramsey mark-up on bound printed matter (36.7 percent) even though bound printed matter has a much lower own-price elasticity of demand (-0.392 as compared with -0.852 for First-Class cards). This result shows how much impact cross-price elasticities can have on net revenues.

The Ramsey volume of First-Class cards is 5,760 million pieces, almost 800 million pieces more than the R97-1 Index volume of 4,974million pieces. Test Year net revenue from First-Class cards is $280 million, about $120 million less than under the R97-1 Index rate schedule.

3. Priority Mail

The Ramsey price for Priority Mail is quite different from the price based on the R97-1 mark-ups. Under the R97-1 Index rates, Priority Mail has an after-rates prices of $4.4382 and a mark-up of 81.0 percent. From a perspective of economic efficiency, this mark-up is too high as it results in a fairly substantial loss of volume. The Ramsey mark-up is 22.5 percent, corresponding to a Priority Mail price of $3.0037, or about one-third less than the R97-1 Index price. As a result of this lower mark-up, volume of Priority Mail under Ramsey pricing is 1,637 million pieces, or 38 percent more than the 1,186 million pieces that would occur at the R97-1 Index price.

4. Express Mail

Express Mail is the most price sensitive postal product considered, with an estimated own-price elasticity of -1.565. Under Ramsey pricing, the mark-up on Express Mail would be quite small. However, the price of Express Mail is constrained to ensure that product revenues cover product incremental costs (see Table 7). Therefore, the price

presented in Table 11 is not the Ramsey price but the lowest price that ensures that incremental costs are covered. Still, this price is less than the price based on the R97-1 mark-up. The constrained mark-up under Ramsey pricing is 50.8 percent, yielding a price of $10.0346 as compared to a R97-1 Index price of $11.2503.

The incremental cost test is designed to prevent a cross-subsidy. As explained in Chapter 3, incremental costs are the costs that would be saved if a product were completely eliminated. If revenues are less than incremental costs, then eliminating the product would actually increase net revenues since the decline in revenues would be less than the decline in costs. Put differently, if revenues of one product are less than the incremental costs of that product, a cross-subsidy exists. The cross-subsidy results because users of the other mail products are making up the difference between the subsidized product's revenues and its incremental costs.

Cross-subsidy is prohibited by the rules of postal rate making. Therefore, prices must be set so that the revenues from each product exceed product incremental costs. Express Mail is the most price elastic mail product and, as such, it has a low Ramsey mark-up. Furthermore, Express Mail has substantial product specific costs so that incremental cost per piece is well above marginal cost and above the unconstrained Ramsey price.

The failure of the unconstrained Ramsey price to satisfy the incremental cost test does not reflect a flaw in the Ramsey price theory. Cross-subsidies can be economically efficient. For example, economic efficiency argues that every mail product should be priced at marginal cost and that the net revenue requirement could be raised from general tax revenues. The economic costs of the tax would be less than the economic costs resulting from setting postal prices above their marginal costs. However, this pricing schedule would involve a cross-subsidy to users of the Postal Service from taxpayers in general and is rejected, not on efficiency grounds, but on grounds of fairness. Similarly,

the unconstrained Ramsey price of Express Mail may be more efficient, but it is less fair since it requires a cross-subsidy from other users of the mail.

The unconstrained Ramsey price of Express Mail is more efficient that the incremental cost test price because raising the price of Express Mail results in a substantial loss in volume with little increase in net revenues. Volume reductions have little or no effect on the level of product specific costs for Express Mail. Consequently, incremental cost per piece increases when volume declines. The increase in incremental cost per piece requires an even higher price, leading to more volume declines, while yielding only small contributions to net revenue. Thus, while it protects against cross-subsidy, the incremental cost test lowers economic efficiency and results in a lower total level of consumer surplus among users of the mail.

However, the incremental cost test can provide valuable and efficient signals to the extent that competitors or potential competitors exist. If price is below incremental cost, a more efficient provider of a competing product might be discouraged from entering the market. This issue is addressed by Ronald R. Braeutigam in "Optimal Policies for Natural Monopolies," Chapter 23 of Handbook of Industrial Organization, Volume II, Edited by R. Schmalensee and R.D. Willig, Elsevier Science Publishers, 1989. Braeutigam recommends "modifying the second-best Ramsey optimal formulation by appending additional constraints to ensure that the resulting prices are as efficient as possible while both being subsidy-free and allowing the firm to break-even. These additional constraints would contribute to dynamic efficiency by guiding prices to send appropriate signals on entry".

It is also worth noting that the R97-1 Index price of Express Mail is considerably less than the before-rates price. The price decline occurs because R2000-1 attributable costs per piece (the cost basis for R97-1 Index pricing) were considerably less than R97-1

attributable costs per piece. Attributable costs per piece declined because Express Mail volume increased, causing the fixed costs of Express Mail to be spread out over a larger volume. Therefore, applying the R97-1 mark-up to the lower attributable cost per piece yields a much lower R2000-1 price. On the other hand, marginal costs per piece (the cost basis for Ramsey pricing) did not change much during the two rate cases and, therefore, the Ramsey price will be less sensitive to the changes in volume that occurred since then.

5. Periodicals In-County

The Ramsey and R97-1 Index mark-up price of Periodicals in-county mail is set at one-half the mark-up for Periodicals Regular mail. In the calculations, the Ramsey mark-up is measured relative to volume variable costs while the R97-1 Index mark-up is measured relative to attributable costs. The mark-ups presented in Table 11 are mark-ups over volume variable costs. That is why under R97-1 Index rates, the in-county mark-up over volume variable costs is not exactly half the regular subclass mark-up over its volume variable cost.

As will be discussed shortly, the Ramsey mark-up on Periodical Regular mail is much greater than the R97-1 Index mark-up for this product. Therefore, the Ramsey mark-up and price of in-county mail is greater than the R97-1 Index price and mark-up.

6. Periodicals Nonprofit

The foregoing discussion regarding Periodicals in-county mail applies to Periodicals Nonprofit mail as well. The Ramsey price of Periodicals nonprofit mail is $0.2650 as compared to a nonprofit price of $0.1881 under R97-1 Index rates. The Ramsey rates yield $165 million in net revenue as opposed to only $23 million under R97-1 Index rates.

7. Periodicals Classroom

Like the other preferred categories of Periodicals mail, the mark-up for Classroom mail is based on the mark-up for Regular mail. Thus, the "Ramsey" price of Classroom

mail is not a true Ramsey price. In fact, the unconstrained Ramsey price would be lower than the price presented in Table 11, though not as low as the R97-1 Index price.

8. Periodicals Regular Mail

The Ramsey mark-up of Periodicals mail is constrained to equal 100 percent, equivalent to a cost coverage of 200 percent. As discussed in Chapter 3, the very low own-price elasticity of Periodicals Regular Mail would produce a very high Ramsey price for this subclass and for the preferred Periodicals subclasses because their mark-ups are tied to the Regular mark-up. The substantial net revenues that these prices would generate would allow for rate reductions in most other categories. It was decided that such a result would provide little practical guidance for rate-makers. Therefore, the Periodicals Regular mark-up was constrained to 100 percent, which along with First-Class letters is the highest mark-up of any mail subclass, consistent with its low own-price elasticity.

In contrast, the R97-1 Index mark-up for Periodicals Regular is the lowest (aside from preferred Periodicals) of any subclass. In terms of prices, the R97-1 Index price of Periodicals is $0.2927, considerably less than the Ramsey price of $0.5482. Despite this large difference in price, there is not much difference in the volumes under the two pricing strategies. Volume under R97-1 Index rates is 7,200 million pieces, or less than ten percent more than the 6,563 million pieces that result under Ramsey pricing. The small difference in volume reflects the low own-price elasticity of Periodicals.

The low mark-up for Periodicals mail in R97-1 was based on consideration of its ECSI (Educational, Cultural, Scientific, and Information) values. Newspapers and magazines provide important benefits to society and the rate-making criteria established for the Postal Service allow for consideration of ECSI values in setting postal rates.

There is to my knowledge no formal guideline regarding exactly how ECSI values should be taken into consideration. Marginal cost pricing (or even near marginal cost

pricing) is not explicitly considered. In fact, it is not even stated that Periodicals should have a below average mark-up. One is left to assume that ECSI considerations justify a lower rate than would exist in the absence of these considerations, but the size of the rate reduction, and indeed, the rate from which the reduction should be made, is unknown.

ECSI considerations can be included in a Ramsey pricing model. One could argue that the dissemination of ECSI values provides important social benefits beyond the benefits accrued to the reader of the periodical. A benefit to those not directly involved with the production and consumption of a good is known as a positive externality. Thus, one could include the external benefits from ECSI dissemination into the Ramsey pricing model, perhaps by lowering the marginal cost of Periodicals Mail to reflect the external benefit (reduced cost) of periodicals. For example, if one felt that each periodical created on average ten cents of social value, the marginal cost of Periodicals mail in the Ramsey model could be set equal to the postal marginal cost less the ten-cent social benefit. The Ramsey mark-up would be applied to this lower social marginal cost.

It is crucial to understand that economic efficiency only allows for adjustments due to *external* benefits. Any benefit that a reader receives from a periodical is a private benefit already reflected in the demand curve for Periodicals mail. Because the external benefits from periodicals are not reflected in private demand, any adjustment to the postal marginal cost in the Ramsey equation would be highly speculative. An alternative approach could be to constrain the price of Periodicals to an even greater extent than was done in this testimony. The impact of this kind of constraint is presented in Chapter 6.

9. Standard A Regular

The R97-1 Index price of Standard Regular mail is $0.2407, yielding a mark-up of 44.5 percent above product marginal cost. The Ramsey price of Standard A Regular mail is $0.2251, or about 6.5 percent less. The Ramsey price of Standard A Regular reflects

its relatively high own-price elasticity, partially offset by the cross-price elasticity with First-Class letters. The cross-price effect means that some of the volume that is lost when the Standard A Regular price is raised above marginal cost is regained by the Postal Service through a small increase in First-Class letter volume.

At R97-1 Index rates, net revenue from Standard A Regular mail is $2,873 million on Test Year volume of 38,737 million pieces. At Ramsey rates, net revenue is $2,368 million on volume of 40,424 million pieces.

10. Standard A ECR

In R97-1, Standard A ECR mail was assigned the largest mark-up of any subclass. Therefore, the R97-1 Index price of Standard A ECR mail is well above its marginal cost, despite the product's relatively high own-price elasticity. In contrast, the Ramsey mark-up of Standard A ECR mail is 15.0 percent and the Ramsey price is 8.64 cents, more than seven cents less than the R97-1 Index price.

The volume of Standard A ECR mail is noticeably greater under Ramsey pricing than under prices obtained from the R97-1 Mark-up Index. The volume increase is a direct result of the much lower price of Standard A ECR Mail under Ramsey pricing, which in turn is a direct result of its relatively high own-price elasticity. But note that the increase in volume is associated with a decrease in total postal expenditures of users of Standard A ECR mail. Because of the decrease in postage, mailers send more mail but spend less on postage. Postage expenditures on Standard A ECR mail under Ramsey pricing are $4.5 billion as opposed to $5.1 billion under R97-1 Index pricing. Thus, some of the increase in Standard A ECR mail volume comes from the channeling of postage savings into additional mail.

It is also possible that some of the increase in Standard A ECR mail volume represents a shift from other forms of advertising. As explained in Chapter 2 of this

testimony, Ramsey pricing need not take account of private firms if those private firms are pricing at marginal cost. The advertising industry is extremely competitive due to the wide variety of available alternatives (direct mail, newspaper, television, radio, billboard, Internet) and marginal cost pricing would seem to be likely. Any reduction in the economic value of these media in response to a decline in Standard A ECR price leads to an equal reduction in economic cost, yielding no net change in overall economic efficiency.

Still, one might argue that the low Ramsey price of ECR mail is somehow unfair either to other mailers or other advertising media. Similarly, it could be argued that the low R97-1 Index price of Periodicals Mail is unfair to other mailers or alternative delivery services. In either case, it must be remembered that the right price – in an economic sense – for these products is marginal cost. If price is above marginal cost, and if product revenues satisfy the incremental cost test, then there is no cross-subsidy from other mail products. Whether it is unfair to competitors depends on if it is considered unfair to have lower marginal costs than your competition.

11. Standard A Nonprofit

For both the Ramsey and R97-1 Index rate schedules, the mark-up for Standard A Nonprofit mail is set at one-half the mark-up for Standard A Regular mail. Consequently, the Ramsey mark-up of Nonprofit mail is somewhat less than the R97-1 Index mark-up, following the rate relation established for Standard A Regular mail. The corresponding Ramsey price is 13.55 cents, as opposed to a price of 14.50 cents at R97-1 Index rates.

12. Standard A Nonprofit ECR

For both the Ramsey and R97-1 Index rate schedules, the mark-up for Standard A Nonprofit ECR mail is set at one-half the mark-up for Standard A ECR mail. Consequently, the Ramsey mark-up of Nonprofit mail is much less than the R97-1 Index mark-up, following the rate relation established for Standard A ECR mail.

13. Standard B Parcel Post

The Ramsey price for parcel post depends not only on the own-price elasticity of parcel post, but also on the demand for its substitute, Priority Mail. The relatively high own-price elasticity would, in itself, produce a low Ramsey mark-up for this product since parcel post price increases would result in relatively large volume declines. Partially offsetting this effect is the increase in Priority Mail volume that would result from an increase in parcel post prices. This offsetting effect on net revenues allows for a higher Ramsey price than would result from consideration of the own-price elasticity alone.

Under Ramsey pricing, parcel post price (measured like all the prices as a fixed weight index price) is $3.2448, about three percent more than the R97-1 Index price of $3.1547. The volume of parcel post is lower under Ramsey pricing due not only to the increase in own-price, but also due to the decline in the price of Priority Mail which would cause some mailers to shift from parcel post to Priority.

Under Ramsey pricing, the parcel post price is more than the Priority Mail price, which would appear to be an anomalous result. However, as noted above, these prices are fixed weight index prices. Parcel post could have a higher average price because parcel post mailings are heavier than the typical Priority Mail piece, while at the same time remaining lower priced for packages of the same weight and traveling the same distance. For the record, marginal cost of parcel post is greater than for Priority Mail, a result that no doubt reflects differences in weight and distance.

Nonetheless, the Ramsey results suggest that some kind of reconsideration of the rate relations between Priority Mail and parcel post might be warranted. At present, for single mailings (non-bulk) of low weight packages, the parcel post rate is barely less than the Priority Mail rate. The Ramsey analysis suggests that it might be better for single-piece

Priority Mail rates to be lower than the parcel post rate, in effect shifting that substream of mail entirely away from parcel post.

14. Standard B Bound Printed Matter

The Ramsey price for bound printed matter is $1.2449, barely greater than the $1.2271 price that results from R97-1 Index pricing. Forecasted volume and net revenues are only slightly different.

15. Standard B Special Rate

Based on the R97-1 mark-up index, the R97-1 Index mark-up for Standard B Special Rate mail over marginal cost is only 8.8 percent. This mark-up is considerably less than the R97-1 Index mark-up for Bound Printed Matter of 34.8 percent, despite the fact that special rate mail has a lower own-price elasticity. Under Ramsey pricing, special rate mail has a higher mark-up than bound printed matter. The corresponding Ramsey price is $2.2677, compared to the R97-1 Index price of $1.5895. The higher Ramsey price leads to a relatively small decline in volume (about ten percent) but a relatively large increase in net revenue ($151 million as compared to only $27 million at R97-1 Index rates). The small impact on volume and large impact on net revenue both result from the low own-price elasticity of special rate mail.

16. Standard B Library Rate

For both the Ramsey and the R97-1 Index price schedules, the mark-up for Library Rate mail is set at one-half the mark-up of special rate. Since the Ramsey mark-up of special rate is higher than the R97-1 Index mark-up, Library rate mail has a higher mark-up under Ramsey pricing. The Ramsey price is $2.1246 while the R97-1 Index price is $1.7593.

The "Ramsey" price of library rate mail is not a true Ramsey price but a constrained price based on the Ramsey mark-up of special rate mail. In fact, the unconstrained

Ramsey price of library rate mail would be lower than the price presented in Table 11, thought not quite as low as the R97-1 Index price.

17. Registry

Registered mail has an estimated own-price elasticity of -0.246 which corresponds to a Ramsey mark-up of 75.1 percent. Thus, the Ramsey price of registered mail is $13.5165, about fifty percent greater than the R97-1 Index price of $9.1146. Volume under Ramsey pricing is about ten percent less than at the R97-1 Index price.

18. Insurance

Insured mail has a low own-price elasticity of -0.179 which yields a mark-up of 143.4 percent under Ramsey pricing. The corresponding Ramsey price is $4.1719, well above the R97-1 Index price of $2.4969.

19. Certified Mail

The Ramsey price for Certified Mail is $2.6317 as compared to a R97-1 Index price of $2.0606. The Ramsey volume is 248.4 million pieces, or 18.2 million pieces less than the R97-1 Index volume. Net revenues under Ramsey pricing are noticeably higher, $238 million as compared to $103 million.

20. COD

The Ramsey mark-up for COD is 121.1 percent, a direct result of its own-price elasticity of -0.192. The R97-1 Index mark-up is only 12.0 percent. Therefore, the R97-1 Index price is about half the Ramsey price, $4.7301 and $9.3407, respectively. Volumes are not much different despite the large price difference because of the low own-price elasticity of COD.

21. Return Receipts

The Ramsey and R97-1 Index price for return receipts are close to one another. The Ramsey price is $1.7021, about fifteen cents less than the R97-1 Index price of

$1.8502. Because of this lower price, the Ramsey volume is greater and the Ramsey net revenue is lower.

22. Money Orders

The Ramsey price for money orders is $0.8995, about fourteen percent less than the R97-1 Index price of $1.0436. As is the case with return receipts, the lower Ramsey price yields a somewhat greater volume and a somewhat lower level of net revenues.

Chapter 6: Gains to Mailers from Ramsey Pricing

A. Gain to Mailers is Measured by Change in Consumer Surplus

The previous chapter showed that some mail products have lower prices under Ramsey pricing while others have higher prices. The present chapter provides a quantitative measure of the impact on mailers of the Ramsey rates as compared to the R97-1 Index rates. Users of the mail benefit under Ramsey pricing because the Ramsey rates are designed to reduce the burden imposed on mailers by the need to generate sufficient net revenues to allow the Postal Service to break-even in the Test Year. The benefit to mailers is calculated as the change in total consumer surplus resulting from a move to the Ramsey-based rates from the R97-1 Index rates.

The fact that the Ramsey-based rates are not pure theoretical Ramsey prices does not alter the basic calculation of mailer gains. In fact, any two rate schedules – however those rates are obtained – can be compared in terms of changes in consumer surplus. Departures from pure Ramsey pricing, either due to constraints imposed in this testimony or due to other considerations, will reduce the gains in consumer surplus. Nonetheless, as a general rule, a rate schedule that more closely aligns with pure Ramsey pricing will yield greater gains to mailers than a schedule with significant departures.

Furthermore, changes in consumer surplus are a critical tool in assessing the costs of rate changes. As noted earlier, the rate-making process requires that reductions in the rate of one mail product requires increases in the rate for another mail product. The gains and losses, and the resulting net gain or loss, from such a change can be calculated by a comparison of consumer surplus. These trade-offs exist whether or not one invokes the principles of Ramsey pricing.

B. Calculation of Change in Consumer Surplus

Recall from Chapter 1 that the change in consumer surplus from a price change has two components: the change in expenditures mailers make to send the volume of mail sent at the Ramsey price plus the net value of the change in consumption resulting from a move to the Ramsey price from the R97-1 Index price.

Considering the case where the Ramsey price is less than the R97-1 Index price, the first part of this change in consumer surplus is:

$$(V_0)\cdot(P_0 - P_R) \qquad (9A)$$

where V_0 is the volume consumed at the R97-1 Index price of P_0, and P_R is the Ramsey price.

The second part of the change in consumer surplus is the net value of the additional consumption that occurs at the lower price. Assuming a linear demand curve for simplicity, that gain is the triangular AREA 2 in Figure 1 and is equal to:

$$\tfrac{1}{2}(V_R - V_0)\cdot(P_0 - P_R) \qquad (9B)$$

where the first term is the increase in volume and the second term is the change in price and the one-half gives the formula for the area of a triangle.

Combining (9A) and (9B) yields the formula for the total change in consumer surplus:

$$\tfrac{1}{2}(V_R + V_0)\cdot(P_0 - P_R) \qquad (9C)$$

If the Ramsey price (P_R) is less than the R97-1 Index price (P_0), the above expression is positive, showing a gain to mailers from a decline in price. If P_R is greater than P_0, there is a loss to mailers from an increase in price. The total change in consumer surplus is the sum of the individual changes across the 22 products considered.

The above measure must be considered an estimate for two reasons. First, the demand curves used in estimating the Ramsey prices and volumes are not linear, but

logarithmic demand curves. A second reason why the above measure of the change in consumer surplus is an estimated gain is that the exact measure is complicated by the interrelation between the demands of many postal products. The demand curve for a given mail product will shift in response to changes in the price of substitute mail products, as opposed to the example shown above in which the demand curve did not shift. The estimated gains to mailers presented in this chapter ignore the effect of shifts in the demand curve resulting from changes in the prices of substitute products. However, because the cross-price elasticities between postal products are generally quite small or non-existent, the resulting shift in the demand curves are also quite small. Consequently, the actual gains to consumers will not be substantially different from the estimated gains presented in this section, as was shown in an interrogatory response to OCA/USPS-T31-10 in the R97-1 case.

Note that equation (9C) shows that the calculation of the change in consumer surplus does not require information about postal costs. Consumer surplus changes are based on postal prices (which to one degree or another are a function of postal costs), but postal costs themselves are not an explicit part of the consumer surplus calculation. In other words, the gains to mailers presented in this chapter are independent of postal costs. [Specifically, the gain presented in Table 13 would exist whether one declares the postal costs to be are "efficient" or "inefficient."]

Second, changes in consumer surplus can be calculated independent of the Postal Service break-even requirement. For example, this chapter also examines the impact on mailers (change in consumer surplus) from moving to the after-rates prices from the before-rates prices. The harm to mailers is then compared to the increase in Postal Service net revenues to see how efficiently the after-rates break-even requirement is satisfied.

C. Postal Service Net Income is Unaffected by Ramsey Pricing

The net income of the Postal Service is unaffected by the move to Ramsey prices. That is because the Ramsey prices and, indeed, any price schedule established for the Postal Service, must satisfy the break even requirement. Net revenues of the mail products considered in this testimony are $26,078 million for both the Ramsey and the R97-1 Index rates.

Although net revenues are the same under Ramsey pricing, total revenues (and total costs) are greater. The Ramsey total revenue is $67,029 million while total revenues under the R97-1 Index prices are $64,666 million. However, the gain in Postal Service revenue is simply a further reflection of the benefits of Ramsey pricing to mailers. Revenue is greater because total volume is greater, 223,651 million pieces as opposed to 202,749 million pieces at the R97-1 Index Rates, an increase of more than ten percent. Volume is greater because rates are set in a way that reduces the adverse impact of price increases on usage of the mail.

The increase in total volume means that the non-volume variable costs of the Postal Service are spread out over more pieces of mail. Consequently, the system-wide mark-up under Ramsey pricing is lower than under R97-1 index pricing, 63.7 percent as compared to 67.6 percent. Average revenue per piece (an aggregate measure of postal prices paid by mailers) under Ramsey pricing is 30.0 cents, or six percent less than the 31.9 cent average revenue at the R97-1 Index rates. Average volume variable cost per piece is also lower under Ramsey pricing, 18.3 cents as compared to 19.5 cents under R97-1 Index pricing. Thus, the increase in total revenues under Ramsey pricing comes not from higher average rates or higher average costs (which would be harmful to mailers), but from higher postal volumes (which is a reflection of the benefits to mailers).

D. Presentation of Gains to Mailers

Table 13 presents the change in consumer surplus for users of each subclass of mail resulting from a move to Ramsey pricing from the R97-1 Index alternative price schedule for the 2001 Test Year. The estimated changes in consumer surplus are calculated from equation (9C) above. Note that products that have a higher Ramsey price (such as First-Class letters) impose a loss on mailers while products that have a lower Ramsey price (such as First-Class cards) provide a gain to mailers. Priority Mail and Standard A ECR show large increases in consumer surplus while Periodicals Mail experiences a large decrease.

Table 13 shows that in aggregate Ramsey pricing provides a net gain to mailers of $1,272 million. This is equal to almost five percent of the total net revenues earned by the 22 products examined in this testimony. The $1,272 million gain to mailers from Ramsey pricing is also equal to about two percent of total expenditures (at R97-1 Index prices) for the 22 products. Put differently, the R97-1 Index rates would have to experience an across-the-board cut of about two percent in order to generate the same level of consumer surplus as the Ramsey-based rates.

It should be noted that the estimated change in consumer surplus is a one-year gain from Ramsey pricing, an annual gain that will continue until the next postal rate case at which time new Ramsey rates could be implemented.

As explained earlier, the gain to mailers presented in Table 13 is an estimated gain for two reasons. First, the estimated gain is based on a linear approximation of the log-log demand curve. Second, cross-price effects cause the demand curves for several products to shift, greatly complicating the calculation of the change in consumer surplus. My testimony in R97-1 and the testimony of Dr. Roger Sherman (OCA-T-300) both showed that the consumer surplus approximation is quite close to its exact value.

TABLE 13
Change in Consumer Surplus from Ramsey Pricing

Mail Product	R97-1 Index Price	Ramsey Price	Change in Consumer Surplus
First-Class Letters	$0.3442	$0.3704	($2,611.1)
First-Class Cards	$0.2111	$0.1794	$170.3
Priority Mail	$4.4382	$3.0037	$2,025.3
Express Mail	$11.2503	$10.0346	$132.1
Periodicals In-County	$0.0979	$0.1414	($36.3)
Periodicals Nonprofit	$0.1881	$0.2650	($149.4)
Periodicals Classroom	$0.2692	$0.3798	($5.5)
Periodicals Regular	$0.2927	$0.5482	($1,758.6)
Standard A Regular	$0.2407	$0.2251	$616.6
Standard A ECR	$0.1594	$0.0864	$3,075.5
Standard A Nonprofit	$0.1450	$0.1355	$107.4
Standard A NP ECR	$0.1163	$0.0785	$106.0
Parcel Post	$3.1547	$3.2448	($32.7)
Bound Printed Matter	$1.2271	$1.2449	($8.6)
Special Rate	$1.5895	$2.2677	($133.9)
Library Rate	$1.7593	$2.1246	($9.8)
Registry	$9.1146	$13.5165	($46.5)
Insurance	$2.4969	$4.1719	($69.4)
Certified	$2.0606	$2.6317	($147.1)
COD	$4.7301	$9.3407	($15.7)
Return Receipts	$1.8502	$1.7021	$32.0
Money Orders	$1.0436	$0.8995	$31.3
Total			$1,272.0

E. Efficiency, Equity, and Consumer Surplus

The overall impact on mailers from Ramsey pricing is measured as the total change in consumer surplus. As Table 13 shows, the total change is comprised of many positive and negative changes across the different subclasses. A fundamental notion is that one dollar lost by a user of mail products that experienced a rise in price is of equal economic value to one dollar gained by a user of a mail product that experienced a fall in price. Therefore, the sum of dollars gained and lost equals the overall impact of Ramsey pricing, which Table 13 shows to be $1,272 million.

Are dollars lost equal to dollars gained? For example, one might argue that $100 is of greater importance to a poor person than to a rich person, because it represents a much larger share of a poor person's income. This might be true, if one is interested in focusing on economic equity. Many government programs use the tax system to redistribute money from richer individuals to poorer individuals. Doing so almost certainly involves an economic loss, but it could be argued that concerns for economic equity outweigh the economic loss that redistribution creates. Similarly, postal rate-makers could redistribute the burden of satisfying the break-even constraint, but they cannot avoid the economic costs associated with moving prices away from the consumer surplus maximizing Ramsey prices.

Moreover, postal prices would seem to be an ineffective way to redistribute money from the rich to the poor. First, most mail is sent by businesses, many of which are small businesses that are arguably less "rich" than the households that receive the mail. Second, as the mail is part of the operations of most businesses, the costs of postage are included in the price of goods and services purchased by households. Therefore, it would be extremely difficult to determine the impact of changes in postal rates on economic equity.

F. Comparisons With Other Rate Schedules

1. Before-Rates Prices

Although Table 13 provides the best direct comparison of the Ramsey and R97-1 Index rates, comparisons to the before-rates price schedule can also be illuminating. In moving from before-rates to after-rates prices, mailers are unquestionably harmed since after-rates prices must be higher on average. The extent of that harm can be measured as the change in consumer surplus. Table 14A shows the percentage change in price, (before-rates to after-rates) and the resulting change in consumer surplus. For most mail products, the change in consumer surplus is negative because the after-rates prices are generally greater than the before-rates prices. The bottom two rows of Table 14A shows the total change in consumer surplus and Postal Service net revenues, again comparing the before-rates and after-rates conditions. For both the R97-1 Index prices and the Ramsey prices, the change in Postal Service net revenues is $3,586 million.

Table 14A shows that under R97-1 Index pricing, raising an additional $3,586 million in net revenues imposes an overall burden on mailers of $3,992 million. Thus, the harm to mailers exceeds the increase in net revenues. Under Ramsey pricing, however, the same $3,586 million increase in net revenues imposes only $2,814 million of harm to mailers, as measured by the loss in consumer surplus. In that case, the harm to mailers is less than the increase in net revenues because the Ramsey after-rates prices correct some economic inefficiencies present in the before-rates prices.

The latter point deserves further attention. While rate cases serve as a means for raising additional net revenue to satisfy the break-even requirement, they are also allow for changes in relative prices to take account of changes in cost or demand conditions. Thus, rate cases provide an opportunity to correct economic inefficiencies that may exist in the existing rate schedule.

TABLE 14A
Comparisons of Before-Rates and After-Rates Prices

	R97-1 Index vs. Before-Rates		Ramsey vs. Before-Rates	
Mail Product	Change in Price	Consumer Surplus	Change in Price	Consumer Surplus
First-Class Letters	0.1%	($49.5)	7.8%	($2,654.8)
First-Class Cards	14.7%	($143.0)	-2.5%	$26.3
Priority Mail	15.1%	($734.2)	-22.1%	$1,263.4
Express Mail	-19.9%	$248.9	-28.5%	$364.7
Periodicals In-County	14.6%	($10.8)	64.2%	($47.1)
Periodicals Nonprofit	16.5%	($55.0)	65.6%	($205.1)
Periodicals Classroom	17.4%	($2.2)	65.5%	($7.7)
Periodicals Regular	21.5%	($378.0)	127.6%	($2,147.0)
Standard A Regular	19.3%	($1,583.6)	11.5%	($968.3)
Standard A ECR	6.7%	($329.2)	-42.2%	$2,706.6
Standard A Nonprofit	17.8%	($248.7)	10.0%	($141.2)
Standard A NP ECR	52.5%	($112.5)	-2.9%	($6.5)
Parcel Post	1.6%	($18.7)	4.5%	($50.5)
Bound Printed Matter	34.8%	($162.3)	36.8%	($171.0)
Special Rate	1.3%	($4.4)	44.6%	($138.4)
Library Rate	2.5%	($1.2)	23.8%	($11.1)
Registry	19.4%	($16.7)	77.0%	($63.6)
Insurance	33.1%	($27.6)	122.4%	($97.7)
Certified	43.1%	($174.6)	82.8%	($324.3)
COD	-8.1%	$1.5	81.5%	($14.2)
Return Receipts	47.2%	($137.9)	35.5%	$105.3
Money Orders	35.5%	($52.3)	11.2%	($20.8)
Total Consumer Surplus		($3,992.1)		($2,813.7)
Total Net Revenues		$3,586.3		$3,586.3

2. Prices Based on an Across-the-Board Rate Increase

Table 14B compares Ramsey rates to rates obtained from applying an across-the-board percentage increase to the before-rates prices. The across-the-board rate percentage increase is the rate increase needed to generate the required net revenues, which in this case is a 6.42 percent increase (given the volume variable costs used in this testimony).

One drawback of an across-the-board rate increase is that it does not take account of differences in the increase in product costs since the last rate case. Every product is assigned the same rate increase regardless of the change in its costs. In some cases, the percentage rate increase might be insufficient to cover volume variable costs, which in fact occurs with all four subclasses of Periodicals Mail and for certified mail. Therefore, the across-the-board prices presented in Table 14B include a larger percentage increase for these mail products so that product revenues at least equal volume variable costs.

Table 14B shows that Ramsey pricing yields an increase in consumer surplus of $1,389 million relative to the across-the-board rates. This gain to mailers is about $117 million more than the gain from Ramsey pricing relative to R97-1 Index rates. This is not surprising because, as noted earlier, an across-the-board rate does not take account of changes in individual product costs, let alone differences in demand elasticities.

One advantage of an across-the-board rate increase is its simplicity and that it maintains relative rate relations between mail products. If relative costs do not change much and if the before-rates prices take account of differences in demand elasticities, then the economic costs of an across-the-board rate increase will be smaller.

TABLE 14B
Comparison of Across-the-Board Rate Increase and Ramsey Pricing

Mail Product	Across-the-Board Price	Ramsey Price	Change in Consumer Surplus
First-Class Letters	$0.3658	$0.3704	($456.6)
First-Class Cards	$0.1959	$0.1794	$91.3
Priority Mail	$4.1024	$3.0037	$1,596.3
Express Mail	$14.9410	$10.0346	$434.2
Periodicals In-County	$0.0943	$0.1414	($39.4)
Periodicals Nonprofit	$0.1767	$0.2650	($173.0)
Periodicals Classroom	$0.2532	$0.3798	($6.3)
Periodicals Regular	$0.2741	$0.5482	($1,895.9)
Standard A Regular	$0.2148	$0.2251	($422.7)
Standard A ECR	$0.1590	$0.0864	$3,058.8
Standard A Nonprofit	$0.1310	$0.1355	($50.7)
Standard A NP ECR	$0.0812	$0.0785	$7.7
Parcel Post	$3.3046	$3.2448	$20.9
Bound Printed Matter	$0.9685	$1.2449	($139.3)
Special Rate	$1.6692	$2.2677	($117.3)
Library Rate	$1.8262	$2.1246	($7.9)
Registry	$8.1245	$13.5165	($57.8)
Insurance	$1.9964	$4.1719	($92.1)
Certified	$1.6736	$2.6317	($254.6)
COD	$5.4760	$9.3407	($13.0)
Return Receipts	$1.3372	$1.7021	($85.0)
Money Orders	$0.8607	$0.8995	($8.8)
Total			$1,388.5

3. ECSI Considerations for Periodicals Mail

In the discussion of Periodicals Regular mail, it was noted that the Ramsey mark-up is much greater than the R97-1 Index mark-up. The low R97-1 mark-up presumably reflects consideration of the ECSI values of Periodicals Mail. The economic costs of this consideration, in terms of lost consumer surplus, can be calculated by comparing two sets of Ramsey prices. Table 14C compares Ramsey prices and volumes of Periodicals mail, The first section of the table is obtained from Table 11. The second section shows the impact of constraining the Periodicals prices to their R97-1 Index prices, while calculating Ramsey prices for the other mail products.

Overall, the lower constrained prices of Periodicals mail increase subclass volume from 9,285 million pieces to 10,130 million pieces, an increase of 845 million pieces, or about nine percent. Total consumer surplus declines by $122 million because the harm to other mailers ($2,071 million loss due to higher non-Periodicals prices) exceeds the benefit to Periodicals mailers.

Table 14C
Loss of Consumer Surplus from R97-1 Index Pricing of Periodicals

Mail Product	As shown in Table 11		Periodicals Prices equal to R97-1 Index Prices		Consumer Surplus
	Price	Volume	Price	Volume	
In-County	$0.1414	812.0	$0.0979	855.5	$36.3
Nonprofit	$0.2650	1,864.4	$0.1881	2,021.5	$149.4
Classroom	$0.3798	45.9	$0.2692	52.9	$5.5
Regular	$0.5482	6,562.9	$0.2927	7,200.1	$1,758.4
Total Periodicals		9,285.2		10,130.0	$1,949.6
All Other Mail		214,365.4		212,684.3	($2,071.4)
Total Mail		223,650.6		222,814.3	($121.8)

4. Comparison of Ramsey R2000-1 and Ramsey R97-1 Rates

A final comparison is made between the Ramsey rates presented in this testimony and the Ramsey rates presented in the R97-1 rate case. Table 14D shows the two sets of Ramsey prices, along with the percentage change in prices between the two cases. Table 14D also shows the percentage change in marginal costs between the R97-1 and R2000-1 cases.

A review of Table 14D shows that in most cases, the percentage change in the Ramsey prices closely corresponds to the percentage change in the marginal costs. For example, the Ramsey price of First-Class letters increased 4.3 percent from R97-1 to R2000-1, quite close to the 6.0 percent increase in First-Class letter marginal costs. Similarly, the Ramsey price of First-Class cards increased 26.3 percent, with the large price increase directly related to the 21.1 percent increase in costs.

One exception to this general rule is Standard A Regular mail which experienced a 12.6 percent decrease in price while undergoing a 15.5 percent increase in marginal cost. In this case, the increase in the demand elasticity between the two cases produced a mark-up that was sufficiently lower to offset the increase in costs. However, the relation between Ramsey price changes and marginal cost changes holds for most mail products and, in fact, the correlation between the two percentage changes exceeds 0.9.

A final observation is that overall marginal cost per piece (i.e., total Ramsey volume variable costs divided by total Ramsey volume) increased 11.4 percent from R97-1 to R2000-1. However, average revenue per piece rose only 2.4 percent. The much smaller increase in average revenue is partly due to the small increase in the net revenues ($25,850 million in R97-1 as compared to $26,078 in R2000-1), but it is also another example of the efficiency benefits of Ramsey pricing.

TABLE 14D
Comparisons of R97-1 and R2000-1 Ramsey Rates

Mail Product	R97-1 Ramsey Price	R2000-1 Ramsey Price	Ramsey Price Change	Marginal Cost Change
First-Class Letters	$0.3551	$0.3704	4.3%	6.0%
First-Class Cards	$0.1420	$0.1794	26.3%	21.1%
Priority Mail	$2.4124	$3.0037	24.5%	28.0%
Express Mail	$11.2947	$10.0346	-11.2%	1.1%
Periodicals In-County	$0.1416	$0.1414	-0.1%	4.4%
Periodicals Nonprofit	$0.2409	$0.2650	10.0%	15.0%
Periodicals Classroom	$0.4229	$0.3798	-10.2%	-6.1%
Periodicals Regular	$0.4724	$0.5482	16.0%	23.9%
Standard A Regular	$0.2575	$0.2251	-12.6%	15.5%
Standard A ECR	$0.0802	$0.0864	7.7%	12.5%
Standard A Nonprofit	$0.1498	$0.1355	-9.6%	7.1%
Standard A NP ECR	$0.0554	$0.0785	41.7%	45.1%
Parcel Post	$4.1123	$3.2448	-21.1%	-13.4%
Bound Printed Matter	$0.8435	$1.2449	47.6%	53.8%
Special Rate	$1.7775	$2.2677	27.6%	13.6%
Library Rate	$2.0383	$2.1246	4.2%	-2.7%
Registry	$8.3269	$13.5165	62.3%	49.7%
Insurance	$2.9067	$4.1719	43.5%	25.9%
Certified	$1.7266	$2.6317	52.4%	48.8%
COD	$9.3372	$9.3407	0.0%	-3.4%
Money Orders	$0.8368	$0.8995	7.5%	9.0%
Overall Per Piece	$0.2928	$0.2997	2.4%	11.4%

Chapter 7: Conclusion

The underlying philosophy of this testimony is that there is important information contained in the demand characteristics of different mail products. Price elasticities of demand quantify how mail volumes respond to changes in postage rates and, in so doing, reveal how mailers value different postal products, what they are willing to pay for those products, and how they react to changes in the price of those products.

Ramsey pricing uses the price elasticity information to develop prices that reduce the overall burden on mailers resulting from the need to satisfy the Postal Service break-even requirement. But whether one uses Ramsey pricing, the trade-offs inherent in the Ramsey formula exist. The increase in the price of one product that is needed to exactly offset the decrease in the price of another depends on how the volumes of each of those products respond to price changes. The volume responses, as measured by price elasticities of demand, indicate whether the price change is having a net positive or net negative impact on the users of the two mail products in question. These impacts occur regardless of the method used to develop postal rates. The Ramsey pricing theory merely makes those trade-offs explicit.

The analysis compares rates based on the Ramsey pricing principles to rates based on the Postal Rate Commissions's recommended mark-ups in the R97-1 case, referred herein as R97-1 Index rates. Both sets of rates generate the same level of net revenues (contribution), but the Ramsey rates are found to yield $1,272 million more in consumer surplus. The increase in consumer surplus is a measure of the overall gains to mailers from the Ramsey rates as opposed to the R97-1 Index rates.

Some skeptics of Ramsey pricing have argued that the gains are relatively small, with $1,272 million amounting to only about two percent of the total revenues of the Postal Service. But two percent of Postal Service revenues is hardly trivial. A program that

reduced Postal Service costs by two percent (with no degradation of service) would be heralded as a great triumph. From the standpoint of the overall welfare of mailers, the gains from a $1,272 million reduction in postal costs would be essentially the same as the gains from the Ramsey prices presented in this testimony.

In a sense, Ramsey pricing is a fairly easy exercise. It is based on two straightforward goals: satisfying the break-even requirement and reducing the resulting burden on mailers. The Postal Service and the Postal Rate Commission have a far more complex set of considerations in determining postal rates and the rate-making criteria appear to require them to examine concerns beyond economic efficiency. Thus, Ramsey pricing can only be a tool to be used in assessing the impacts of including these different rate-making criteria. Nonetheless, an important advantage of Ramsey pricing, or more generally, of the calculation of changes in consumer surplus, is that the results are largely free of judgment. The rate-making criteria, on the other hand, appear to be much more subjective. In fact, a large portion of intervenor testimony is dedicated to advocating a specific interpretation of these criteria. In assessing these different positions, rate-makers should not lose sight of the fact that regardless of what mailing interests say, what they will do is ultimately revealed by their underlying demand for mail.